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ABSTRACT

This solid waste activity packet introduces students to the solid waste problem in Illinois. Topics explore consumer practices in the market place, packaging, individual and community garbage generation, and disposal practices. The activities provide an integrated approach to incorporating solid waste management issues into subject areas. The activity packet is divided into six sections: (1) introductory activities; (2) reduce; (3) reuse; (4) recycle; (5) residue: landfill incineration; and (6) teacher resources. Each lesson provides the organizing concept, objective, method, materials, subjects, skills, time, resources, vocabulary, background, leading question, procedure, evaluation, extensions, and original source. The teacher resource section contains a glossary, state learner goals, additional resources and reproducible pages for overhead projection. (Author/MCO)

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SOLID WASTE ACTIVITY PACKET
for Teachers

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INTRODUCTION

The Solid Waste Activity Packet for Teachers has been developed by the Illinois Department of Energy and Natural Resources, Office of Recycling and Waste Reduction, and the Illinois Cooperative Extension Service. The packet has been field tested by elementary teachers in Illinois. The packet introduces students to the solid waste problem in Illinois. Inspired by numerous other states' educational efforts, this packet is a compilation of successful learning activities used across the nation. Response to these issues will require action on the part of all consumers, including teachers and students.

The packet was prepared in response to a need identified by the Illinois General Assembly to require instruction in "...the conservation of natural resources, including but not limited to air pollution, water pollution, waste reduction and recycling..." Illinois School Code (Il. Rev. Statute 1989, ch. 122, par. 27-13.1).

The activities in this packet provide an integrated approach to incorporating solid waste management issues into the subjects of math, science, social studies, language arts, and art.

Use the material in this *Solid Waste Activity Packet for Teachers* to introduce your students to the importance of waste reduction and recycling. Teach your students about consumer practices in the marketplace, packaging, volumes of garbage generated by individuals and communities, and current disposal practices. You and your students will discover there is no one solution to this difficult problem. These activities explore the solid waste issue and encourage students to take positive action to reduce, reuse, and recycle.

When you have used the *Solid Waste Activity Packet*, let us hear about how the program worked for you. Other teachers and leaders could gain from your experiences.

Printed on recycled paper.

ACKNOWLEDGMENTS

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Materials

Materials in this packet adapted and reprinted from the following sources:

AVR Teachers Resource Guide
Association of Vermont Recyclers
P.O. Box 1244
Montpelier, VT 05602

Here Today, Here Tomorrow...
New Jersey Department of Environmental Protection, Division of Solid Waste Management
CN414
Trenton, NJ 08625-8591

Let's Put Waste in Its Place
Philadelphia School District
PhilaPride, Inc.
123 S. Broad Street, Suite 1326
Philadelphia, PA 19109

Recycle for Reuse 4-H
Cooperative Extension Service
3228 Lowell Hall
610 Langdon Street
University of Wisconsin - Extension
Madison, WI 53703

Community Recycling Center
720 N. Market
Champaign, IL 61820

A–WAY With Waste
Department of Ecology
4350 – 150th Avenue NE
Redmond, WA 98052

Bell, O. and Martha M. Schwartz
Oscar's Options, Book II
Ocean State Cleanup and Recycling
Department of Environmental Management
83 Park Street
Providence, RI 02903

Wisconsin Fast Plants
Department of Plant Pathology
University of Wisconsin
1630 Linden Drive
Madison, WI 53706

Wisconsin Department of Natural Resources
Bureau of Solid Waste Information and Education
P.O. Box 7921
Madison, WI 53707

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INTRODUCTORY ACTIVITIES

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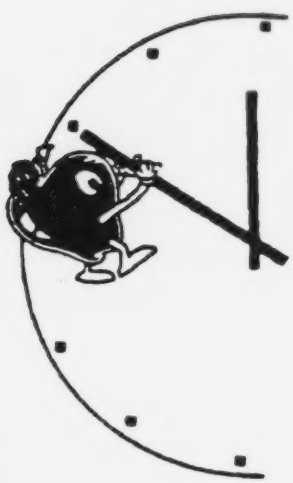
Solid Waste Bulletin Board 9

What Kind of Waste Am I? 11

Waste Reduction Guide for Illinois Schools 14



Help stop the garbage clock. Don't let time run out on us!

Garbage-Bag Recipe

Concept

Solid waste is everything we find useless and throw away.

Objective

Students will define solid waste, identify major components of the waste stream, and begin to question their throwaway habits.

Method

Students will create a classroom trash bag.

Materials

Waste basket, typical trash items from the attached trash-bag recipe.

Subjects

Language arts, science, social studies.

Skills

Reasoning, logical thinking, sorting, and classifying.

Time

One class period.

Resources

Current waste stream composition studies.

Vocabulary

trash, resource, waste, reuse, recycle.

Adapted from the Association of Vermont Recyclers *Teacher's Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601.

Background

More than 60 percent of what we throw away still has value and could be reused, recycled, or composted. Diverting these resources from the waste stream begins with recognizing the resource potential of what we throw away each day. This activity sets the stage for many more by creating a classroom prop you can use over and over for different lessons.

Leading Question

What kinds of things do we throw away?

Procedure

1. Begin by examining the objects in the classroom trash can. Discuss the differences between trash in different places. What kinds of trash would be found in the cafeteria or in different rooms at home?

2. Cut up the list on page 4 so that each child has only one or two items. Ask them to bring either the item itself or a drawing of the item pasted on cardboard to class the next day.

3. When all the components have been assembled, the garbage bag can be used for different lessons. The contents can be sorted and classified by different packaging types, objects with different resource bases, biodegradable or nonbiodegradable, made from renewable or nonrenewable resources, recyclable or reusable, etc. What can they be recycled into? How could they be reused?

Evaluation

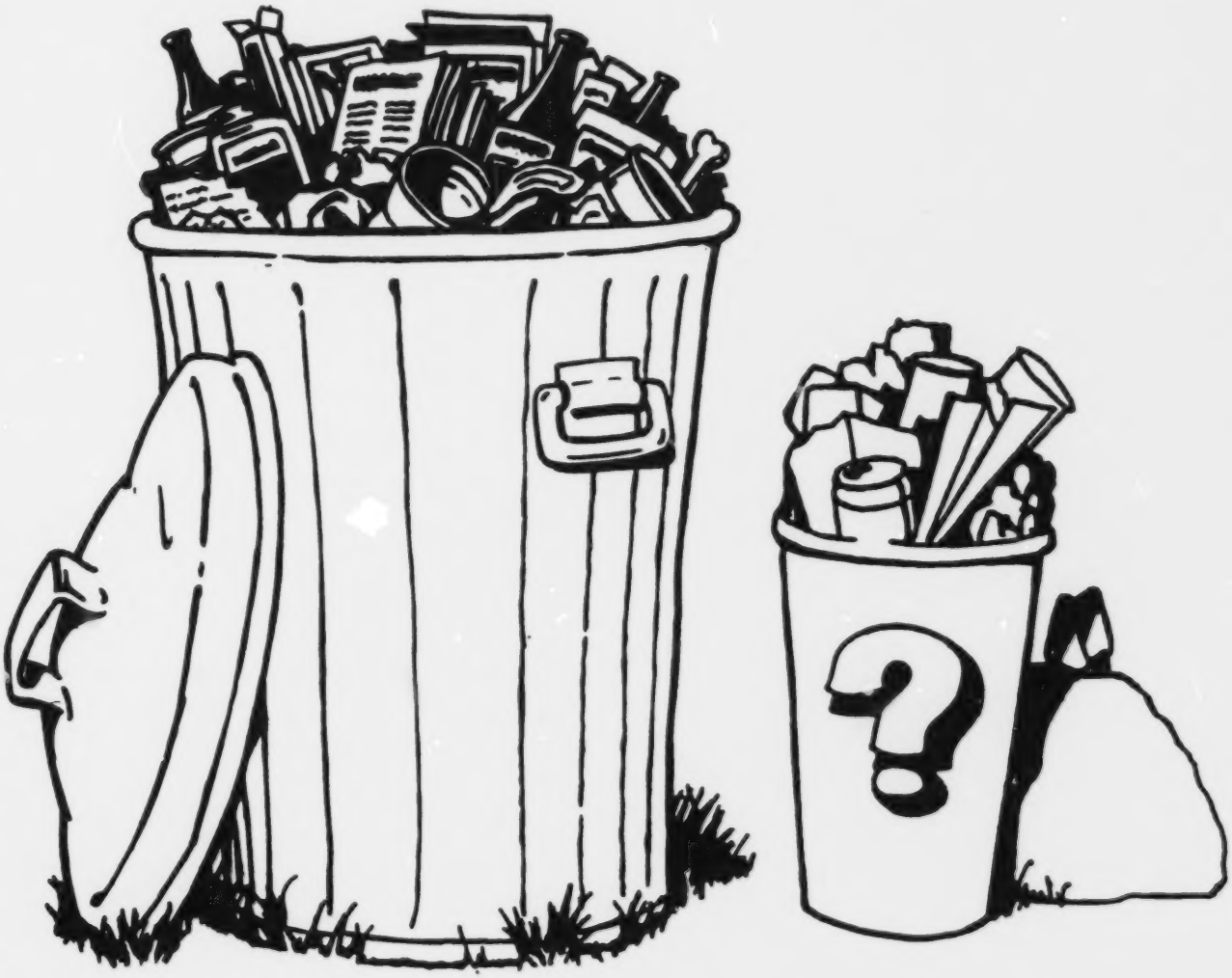
What is waste? Things we don't use or want anymore. What are resources? Things that we do use or need or value. Name one thing that is waste and one thing that is a resource. Name one thing that you throw away which could be a resource instead of waste.

Extensions

A. Who wants to go to the landfill? Hand one trash object to each student and have all the students stand together in a group representing one large trash bag. The teacher can be the trash collector who will take the trash away. Describe what happens at a sanitary landfill and ask if anyone really wants to go to the landfill. If not, they can be rescued by thinking of a way they can be reused or recycled. Try to save all the items of the trash bag by thinking up alternatives. Discuss ways to redesign products that cannot be recycled or reused. Continue until all the students have been rescued.

B. Make a trash can display. Show a typical breakdown of different types of trash. Use magazine cutouts for a collage. Also bring in real things.

C. Find magazine pictures. Look for things that get thrown out after one use and things that last a long time. Make posters or a display (razors, paper napkins, paper grocery bags, ballpoint pens, etc.) of the two types. Compare each throwaway object to the same object 50 or 100 years ago.



Ingredients of Garbage Bags

This list represents the contents of a typical five-pound residential trash bag.

- ☐ paper plate
- ☐ brown paper bag
- ☐ glass jar
- ☐ aluminum can
- ☐ old rag
- ☐ disposable diaper
- ☐ some junk mail
- ☐ corrugated packing box
- ☐ plastic fresh-produce bags
- ☐ six-pack ring
- ☐ polystyrene cup
- ☐ plastic film
- ☐ newspaper
- ☐ plastic margarine tub
- ☐ plastic detergent bottle
- ☐ banana peel
- ☐ apple core
- ☐ some dead flowers
- ☐ dead branches and/or leaves
- ☐ cardboard egg carton
- ☐ cardboard cereal box
- ☐ chicken bones
- ☐ brick-pack juice container
- ☐ plastic cider jug
- ☐ plastic-coated cardboard milk carton
- ☐ polystyrene egg carton
- ☐ coffee grounds
- ☐ fast-food restaurant packaging

Adapted from the Association of Vermont Recyclers *Teacher's Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601

Out of Sight, Out of Mind

Goal

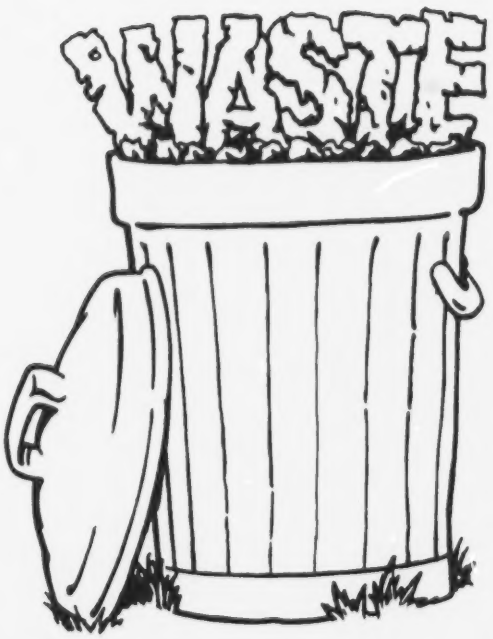
To help students visualize how much waste is generated for each person in Illinois and understand how the number of people living in our state and country affects this waste.

Subjects

Mathematics, social studies, science, environmental education, health.

Materials

Five-pound bag of miscellaneous trash (wash containers, avoid items with sharp edges).



Procedure

1. Describe trash and list some examples.

Discuss:

What qualities does an item have that makes you decide it's trash?

What different kinds of trash are there?

2. Dump the five-pound bag of trash on the floor.

Discuss:

Does this seem like a lot of trash? This much trash is thrown out each day for every person in Illinois.

How do you think the number "five pounds" was calculated? Who figured out this number? Will the number ever change? Why?

How do you feel about the fact that you're responsible for five pounds of trash that is thrown out each day?

3. Calculate:

If you generate five pounds of trash each day, how many pounds do you make every week, month, and year?

Convert these numbers from pounds into tons. How many tons of trash do you make every week, month, and year?

To help you visualize how much a ton weighs, add the weights of students in the class until you reach one ton. How many students does it take to make a ton? How many "students-worth" of trash do you make every week, month, and year?

How many people are in your family? If five pounds of trash is generated each day for every person, how many pounds or tons of trash does your family make every week, month, and year?

How many people live in Illinois? How many pounds or tons of trash are generated each day in Illinois?

4. Discuss:

What happens to all the trash you throw away?

Where is "away"? Is there such a place?

What do you think happens to waste at the landfill?

What are possible problems with piling waste in landfills?

What would you do with your family's trash if there were no truck that came to take it away? How might this affect the amount of trash your family makes?

Research the rate of human population growth in Illinois and the U.S. since 1650.

What relationship might there be between an increasing human population and the amount of solid waste generated?

How might the amount of solid waste generated be influenced by changes in lifestyles since 1650?

How might the amount of solid waste generated be influenced by family income?

How have increases in numbers of people and amounts of solid waste affected the environment?

What are the predictions for future human population growth?

What predictions might you make for the amounts of solid waste we'll produce in the future?

What impacts might an increasing population have on our use of natural resources?

5. Calculate:

If every person in Illinois threw away one less pound of trash per day, how much less trash would end up in our state's landfills?

Discuss:

What could you do to reduce the amount of waste you make?

Pre- and Post-Activity Questions

How many pounds of trash do you think are thrown out each day for every person in Illinois?

What relationship, if any, is there between the number of people and the amount of trash?

Adapted with permission from: *A-way with Waste*, Department of Ecology, 4350 150th Avenue, N.E., Redmond, WA 98052.

Out of Sight, Out of Mind Worksheet

Student weight _____ Student weight holding bag of trash _____

Calculate the weight of the trash:

Student wt. holding bag of trash _____ lb. — student wt. _____ = Weight of trash _____lb.

Calculate amount of trash generated:

every week _____lb. each day × 7 days = _____ lb. trash

every month _____lb. per week × 4 weeks = _____lb. trash

every year _____lb. per week × 52 weeks = _____lb. trash

If a ton of waste equals 2,000 pounds, what part of a ton do you generate in a week?

_____lb. trash in 1 week ÷ 2,000 lb. = _____ of a ton

_____lb. trash in 1 month ÷ 2,000 lb. = _____of a ton

_____lb. trash in 1 year ÷ 2,000 lb. = _____of a ton

To help you see how much a ton weighs, calculate how many classmates it will take in a group to equal one ton. To do this, calculate the average weight for each student in your class. Your teacher will need to give you the sum of everyone's weight in your class.

_____sum of all student's weights. ÷ _____ # of students in class = _____

Average student weight of _____ lb.

To determine number of students from your class needed to make a ton:

2,000 lbs/ton ÷ average student weight of _____lb. = _____number of students equal to a ton.

How much garbage does your family generate?

_____lb. per person × _____family members = _____lb. trash each day.

_____lb. trash each day × 7 days = _____lb. trash each week.

_____lb. trash each week × 4 weeks = _____lb. trash each month.

_____lb. trash each month × 12 months = _____lb. trash each year by my family.

Illinois population according to latest census is 11,430, 602 (1990 census).

Can you calculate the amount of trash thrown out each day by Illinois citizens? _____

If every person in Illinois reduced the amount they threw away by one pound each day, how much less trash would end up in our state's landfills? _____

Solid Waste Bulletin Board

Concept

What we choose to do with our trash (reuse, recycle, recover, or revise) will have an impact on our lives and our environment.

Objective

Students will evaluate solid waste items and decide in which of the above four categories to place them.

Method

Students will bring solid waste items from home or find them in the classroom and categorize them.

Materials

Bulletin board, thumbtacks, solid waste items from home.

Subjects

Science, social studies.

Skills

Evaluating, decision making, classifying, experimenting.

Time

Can be run throughout unit on recycling.

Resources

The Trash Monster.

Vocabulary

revise, reuse, recycle, recover.

Background

Solid waste can be classified as reusable, recyclable, recoverable, or as a product that needs to be revised. 1) Revise means to change (habits and attitudes in buying and using products as well as redesigning products). 2) Reuse means to use again. 3) Recycle means to collect used products and make them into new products. 4) Recover means to produce energy by burning trash.

Leading Question

What can I do with this piece of solid waste?

Procedure

1. Introduce the concepts of Revise, Reuse, Recycle, and Recover.

2. Set up a bulletin board divided into sections with those four categories as headings. Have students begin tacking up items appropriate to each heading and have them explain why it belongs in that category. Some items may be appropriate to more than one heading.

Evaluation

Can the students reasonably explain their choice of category for the item they are displaying?

Extensions

A. For the items in the "Revise" category, how could it be changed? Have the students redesign the product to be less wasteful.

Adapted from the Association of Vermont Recyclers *Teacher's Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601

Solid Waste Bulletin Board Worksheet

Name _____ Date _____

I can't	I don't want to	I might	I'll do it sometimes	Easy, I'll do it	
					Buy products in bulk that are not excessively packaged.
					Leave grass clippings on the lawn to reduce your yard waste.
					Make a compost pile in your backyard and turn yard wastes into fertilizer.
					Use dishes instead of paper plates and paper cups.
					Save newspapers for recycling.
					Use the back of writing and drawing paper.
					Save envelopes and wrapping paper to use again.
					Save cans and bottles for recycling.
					Use plastic bags over and over.
					Use reusable tote bags for groceries.
					Take a lunch box or reusable lunch bag to school.
					Make art projects, games, and toys out of recycled or reused materials.
					Use shredded newspaper for animal bedding.
					Start a recycling club at your school.
					Enter a recycling invention at your school's science fair.
					Plant trees.
					Fix things instead of throwing them out.
					Give outgrown clothes to someone smaller.
					Share books and games with your friends.
					Talk to people about ecology.
					Add things to this list and make copies for other people.

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What Kind of Waste Am I?

Concept

The earth is the source of everything we make, use, and throw away.

Objective

Students will review different characteristics of waste.

Method

Students will play a game of 20 questions.

Materials

Aluminum can, glass bottle, paper napkin, fruit peel, plastic bag, other trash objects as needed (avoid composite packaging).

Subjects

Language arts, science.

Skills

Convergent thinking (set-theory), critical thinking.

Time

Full period to introduce vocabulary: 10-20 minutes for each guessing game.

Vocabulary

natural resources, renewable, human-made, containers, compost, biodegradable, recyclable.

Adapted from the Association of Vermont Recycler's *Teachers' Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601

Background

This activity illustrates that the earth is the source of everything we make, use, and throw away. Through the use of classifying skills, the different properties of natural and human-made objects will be reviewed.

Leading Question

Name one thing we throw away that didn't come from the earth.

Procedure

1. Review vocabulary and categories of waste that will occur in the guessing game. A bulletin board is suggested.

2. Without letting the class see what you are doing, put one of the trash objects in a brown paper bag. Show the contents to one student, then set the bag aside.

3. The class will then begin asking the student questions to determine what is in the bag. Some suggested questions are:

Do I come from the earth?

(There's one trick here, a meteorite.)

Am I made from a renewable resource?

A nonrenewable resource?

Am I made by a person?

Am I made from minerals, fossil fuels, etc.?

Am I made from animals or plants?

Am I biodegradable?

Am I packaging?

Am I a container?

Do I contain food?

Am I recyclable?

Am I compostable?

When the identity of the object has been determined, have the student pin the object on the resource tree display.

4. Repeat the activity until all the trash objects have been identified. (The resource tree display can be left intact with new objects added to it each day as a continuing review of concepts.)

Option: Make a resource tree display (see following page), and have students ask questions to show where their piece of waste belongs on the display.

Evaluation

Students should be able to differentiate between natural and human-made materials, packaging and nonpackaging items, animals, plants and minerals, renewable and nonrenewable resources, and be able to identify compostable and recyclable materials.

Extensions

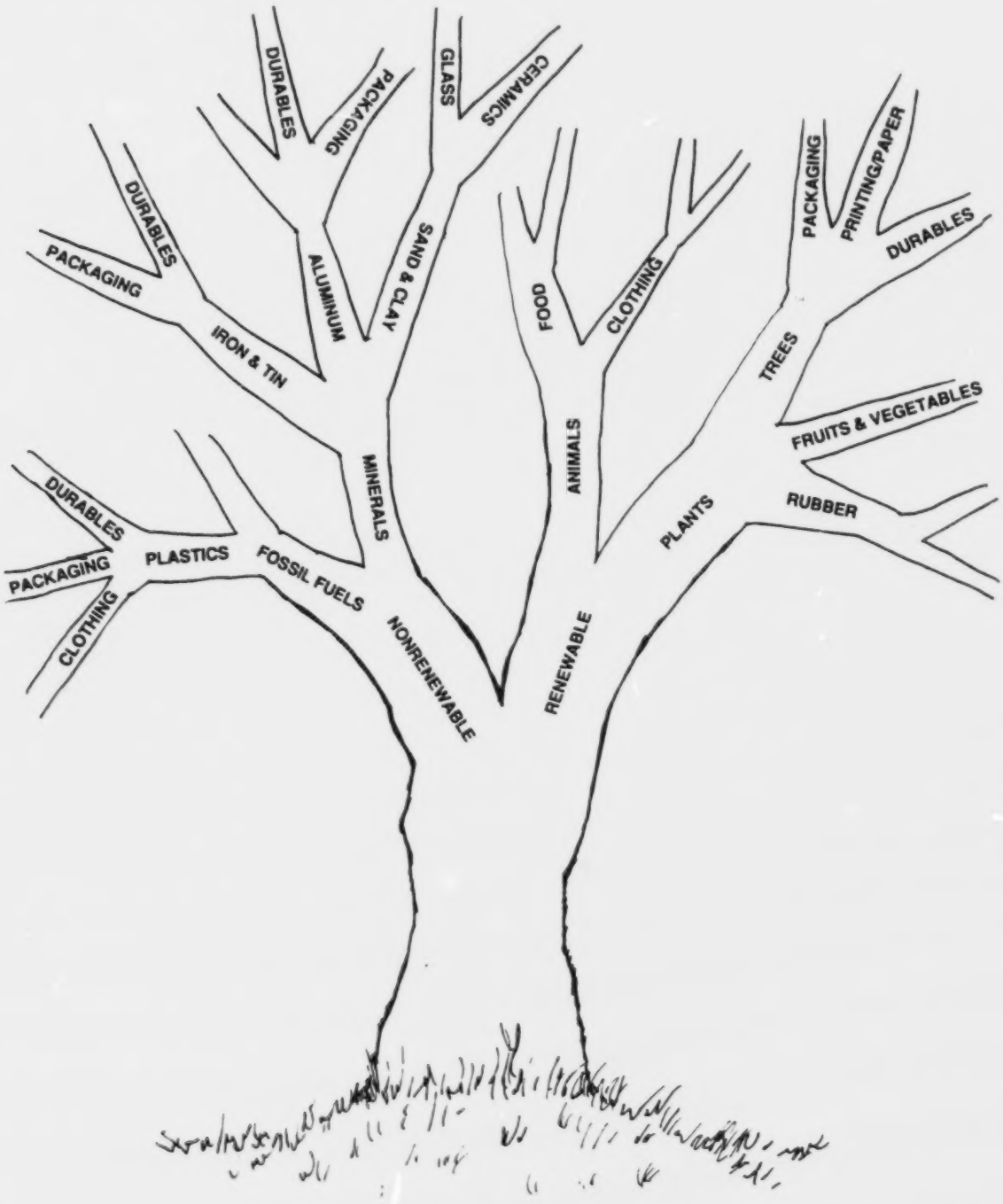
A. Make posters, collages, or displays of packaging examples from each of the following areas: natural, human-made, from nonrenewable resources, from renewable resources, biodegradable, nonbiodegradable.

B. Have students trace the life history of a common trash object (e.g., chicken bone—chicken—grain—earth). Did it come from a renewable or nonrenewable resource?

SAVE A TREE.
Recycle.

Resource Tree Display

The earth is the source of everything we make, use, and throw away.



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Waste Reduction Guide for Illinois Schools

Following is the verbatim text of the ENR document ILENR/RR-90-93 (May 1990). Additional copies of the *Waste Reduction Guide for Illinois Schools* are available from the ENR clearinghouse at (800) 252-8955.

Introduction

This guide describes a waste reduction program for Illinois schools, kindergarten through twelfth grade. It is designed to be used by any school administrator, teacher, staff person, student, and/or parent willing to provide leadership, generate enthusiasm, and publicize the program. By combining traditional lessons with the actual practice of waste reduction and recycling, students can apply their classroom skills to solve real-life problems. In developing this guide, the Illinois Department of Energy and Natural Resources (ENR) is responding to a need identified by the General Assembly, communities, and schools to educate children about the solid waste problem and to provide workable solutions. Students can make a difference!

Reasons for Waste Reduction

In the United States we throw away about 160 million tons of garbage each year. This is enough to fill a fleet of garbage trucks encircling the earth six times. To consider the magnitude of garbage thrown away each day in the United States, visualize a line of garbage trucks stretching from the northern to the southern tip of Illinois. Each day Americans create enough waste to fill all these trucks. In Illinois, as elsewhere, we are running out of landfill space as garbage continues to mount and old landfill sites close. It has become increasingly difficult to build new landfills due to public opposition. By the mid-1990s, existing Illinois landfills will be filled unless we change our current throwaway behavior.

The key to solving the garbage problem is to reduce the waste we create. Waste reduction means two things—source reduction and recycling. Source reduction involves limiting the amount of waste produced and the volume of material discarded. Recycling is a system of collecting and processing materials of remanufacture into new products for resale and redistribution. Once materials are back in service, the recycling "loop" is closed. A waste reduction program reduces waste at the source and manages materials so they do not contribute to the growing landfill problem.

You can create a waste reduction program which helps turn our environmental problem around by teaching students good conservation habits such as reducing, recycling, and reusing materials that all too often are considered waste. Establishing a school waste reduction program is not complicated. It is a hands-on teaching approach which can be easily understood by students, faculty, administrators, staff, and parents. Through a multidisciplinary approach, solid waste management education helps fulfill many of the Illinois state goals for learning from art to geography, music to science, and language arts to mathematics. Such an approach is an excellent

tool for teaching the values of responsibility, cooperation, constructive use of resources, and respect for the environment. The habits of waste reduction, taught in the school, carry over to the home and reinforce community waste reduction programs. With your guidance, students can do their part in making a better world by starting in the school.

Steps for Starting a School Waste Reduction Program

The following steps provide a general framework for planning, implementing, and evaluating a waste reduction program. Each school will want to modify the program to meet its special needs. Use the checklist on the last page to help establish your school's waste reduction program.

1. Committee

Establish a planning committee that provides guidance and general support for the waste reduction program. Include on the committee:

an administrator;

a student;

a teacher;

a clerical, custodial, and lunchroom staff representative;

and a parent-teacher organization representative.

2. Coordinator

Select a coordinator to lead the committee who will spark the interest of the rest of the school and ensure program success. The coordinator's role is to organize activities, solve problems, and monitor the program. Student and staff helpers can assist the coordinator.

3. Community Officials

Meet with community officials who enforce fire, health, and safety codes for advice on how recyclable materials should be handled and stored. The use of safety equipment such as gloves and safety glasses should be stressed at all times when recyclable materials are being handled. Contact municipal or county solid waste reduction programs. Seek their assistance on getting the program started and running smoothly.

4. Markets

Identify markets for recycled material by finding out what materials are recyclable in your community. Find out which recycling centers and recycling businesses will accept what types of materials such as paper grades, glass, plastic, aluminum and other metals.

- Check the yellow pages of your local telephone directory under recycling and waste paper dealers (a waste paper dealer buys and processes recycled paper for sale to paper mills and other end markets);
- Contact community garbage collectors and recycling centers; and/or
- Call the Illinois Department of Energy and Natural Resources Clearinghouse for information on recycling centers, waste paper dealers, and a market directory at (800) 252-8955.

5. Materials Reduced and Recycled

Assess source reduction opportunities and decide what school-generated materials to reduce and which to recycle. Consider materials from the classroom, office, cafeteria, and grounds, including:

- Low-grade paper such as construction paper, writing tablets, and colored paper;
- High-grade paper such as white notebook, office, computer, ditto, and copy paper that is free of tape and other contaminants;
- Other materials that could be recycled, including newspapers, old corrugated cardboard, glass, aluminum and other metal cans, plastic (polystyrene and other plastic packaging materials), and yard waste (compost on school grounds).

6. Goals

Establish school goals for an overall amount of recyclable material to be collected. Help students design charts that monitor the amount of material collected on a monthly basis. Keep a running total displaying your school's progress in a prominent place. Students will try hard to reach goals if they know what is expected.

7. Promotion

Develop a promotional program that informs teachers, staff, students, and parents about the waste reduction program.

How to Get Students Involved in the Program

Explain the reason for the waste reduction program, promote student and staff participation, and illustrate what materials to target. Encourage noncompetitive school activities such as:

- designing posters illustrating what, how, and why to reduce and recycle;
- teaching waste reduction concepts through a multidisciplinary approach. For example, during:
    - language arts — write essays on reducing garbage;
    - science — study source reduction, recycling, and composting;
    - social studies — compare the amounts, types, and methods of materials reduced and recycled in different parts of the United States and throughout the world;
    - mathematics — weigh, chart and convert to volume reduced or collected materials;
    - art — create weaving, sculpture, papier mache, papermaking, masks, and puppets from discarded paper, fabrics, and other materials; and
    - music — make musical instruments using recyclable materials and singing songs using lyrics about garbage and recycling.
- surveying the community to determine why some people reduce and recycle wastes and others do not; and
- having older students teach younger ones about waste reduction.

How to Help Students Model Good Conservation Habits

- Promote source reduction by using two-sided copying; route information rather than recopying; and reuse office paper as scrap paper in the classroom.
- Encourage cafeteria lunches and lunches brought from home that have reusable or recyclable trays, plates, and utensils.
- Create a school compost pile for nonmeat food scraps and yard wastes. Be sure to check whether composting is allowed by local ordinance.
- Use refurbished or recycled toner cartridges and typewriter ribbons.
- Close the recycling loop by purchasing recycled copier and computer paper.

How to Keep the Program Going

- Chart the decrease in garbage disposal costs and volumes due to the implementation of the waste reduction program.
- Publish reports about the program in school newsletters and local newspapers.
- Award certificates of waste reduction to participating students and teachers.
- Inform students, teachers, administrators, parents, and the community of the program's ongoing success.
- Give presentations to PTO meetings and design school plays around a waste reduction theme.
- Work with local media for publicity.
- Have representatives from your local recycling business, waste hauler, or environmental group visit your school and discuss waste reduction and recycling.

8. Containers

- Obtain classroom and building storage containers.
- Classroom storage containers may be made from cardboard boxes with signs listing and

illustrating recyclable materials. Place the containers next to classroom waste cans as a reminder to students to recycle. Students will enjoy decorating the boxes with school logos, slogans, and colors.

- Depending on the school's available storage space, either inside or outside bins or sheds are helpful for storing recycled material.

- Remember to segregate recyclable materials so they are acceptable to markets. For example, high-grade paper should be stored only with high-grade, low-grade with low-grade, and newspaper with newspaper. Contaminated recyclables are of little or no value to markets.

9. Collection and Transportation

Arrange for collection and transportation of recyclable materials.

- *Building storage.* Classroom teachers may select students on a rotating basis to empty classroom containers into designated building storage containers, bins, or sheds.

- *Transportation.* Collection may be arranged with local community recycling centers, school operations personnel, volunteer teachers, or parents who may transport material to processing centers.

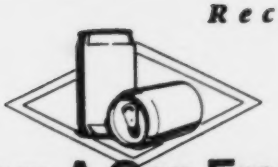
10. Reevaluation

Ensure that the committee reevaluates the program on a regular basis, making modifications as needed. Each component of the program needs evaluation to meet overall program goals.

Checklist for a Successful School Waste Reduction Program

- ☐ Establish a planning committee.
- ☐ Select a coordinator.
- ☐ Meet with community officials and solid waste coordinators.
- ☐ Identify the markets for recyclable materials.
- ☐ Decide what school-generated materials to recycle.
- ☐ Establish school goals.
- ☐ Develop a promotional program that provides recognition.
- ☐ Obtain storage containers.
- ☐ Arrange collection and transportation of recyclable materials.
- ☐ Reevaluate the program.

Turn Your Old Paper
Into Good News.
Recycle.



Save A Can From
A Life On The Street.
Recycle.

Send Your Leaves
To A Mulch Better Place.
Recycle.

Give Your Trash
A Second Chance.
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Today For Tomorrow

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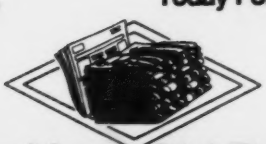

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REDUCE

Not in My Shopping Cart 21

Why Buy Me? 23

Paying the True Price of Pop 25

What Can I Do to Change Packaging? 27

Not in My Shopping Cart!

Subjects

Home Economics, English.

Teaching Time

30 Minutes.

Focus

Waste Reduction, Nonrenewable Resources.

Rationale

Packaging often ends up as waste and uses energy and raw materials.

Learning Objectives

Students will:

- Understand the purpose of packaging.
- Identify wasteful packaging.
- Identify alternatives in packaging.
- Identify steps that can be taken to affect the packaging options available in the marketplace.
- Learn to recognize products packaged in recycled materials.

Teacher Background

Nearly $1 out of every $10 spent for food and beverages in the United States pays for packaging.[1]

In industrial countries, packaging contributes about 30 percent of the weight and 50 percent of the volume of household waste.[2]

Procedure

1. Discuss reasons for packaging decisions such as aesthetics, environmental protection, safety, convenience, and economics.

2. Have students complete the "Packaging Decisions" worksheet found on the following page.

3. Discuss students' ranking of packaging alternatives.

Pre- and Post- Test Questions

1. Why do we sometimes need packaging on the things we buy?

2. Can you list four examples of packaging materials?

[1] Pollack-Shea, Cynthia. 1987. Realizing Recycling's Potential. In *State of the World 1987*, p. 103. New York: W.W. Norton & Company.

[2] Ibid.

Packaging Decisions

A manufacturer must decide how to package baby lotion. The product developers meet to discuss this problem. What decisions might be made if the product developer was primarily concerned with each of these values?

Write the correct number in the blank.

Packaging Decision Values

____ a. Use a flip top for easy access.	**1. Aesthetics**
____ b. Make the package from recycled materials.	**2. Environmental protection**
____ c. Make the package colorful.	**3. Safety**
____ d. Use a child-resistant cap.	**4. Convenience**
____ e. Use a lighter-weight material to save costs.	**5. Economics**
____ f. Make the package refillable.	
____ g. Design the package to maximize shipping and shelf space.	

If you were the manufacturer, how would you rank these alternatives? Justify your packaging decision.

_____

_____

_____

_____

Answers to questions:

a. 4, b. 2, c. 1, d. 3, e. 5, f. 2, g. 5

Source: Proctor & Gamble, *Decisions About Product Safety*

"Why Buy Me?"

Objectives

Students will identify some of the influences, appeals, and techniques advertisers use to promote products. Students will determine if recyclability and waste reduction are used as selling points in advertising.

Subjects

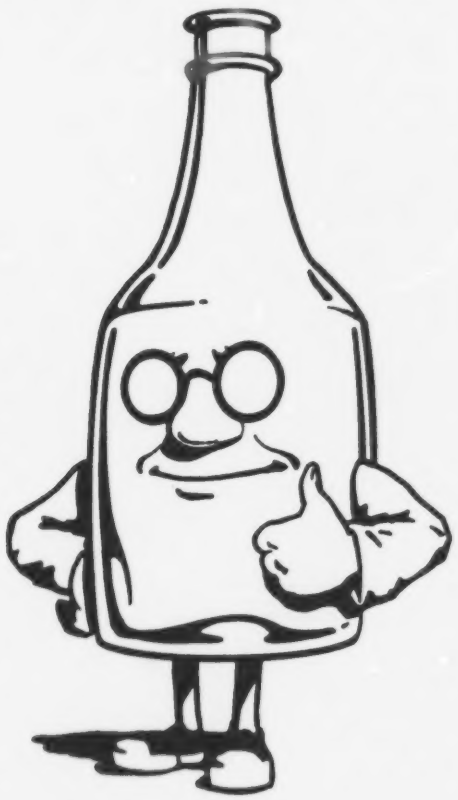
Social studies, English, home economics.

Skills

Critical thinking, brainstorming, classifying, listing.

Materials

Pens, survey chart, magazines, survey sheet.



Reprinted with permission from: *Here Today, Here Tomorrow*, New Jersey Department of Environmental Protection, Division of Solid Waste Management, CN 414, Trenton, NJ 08625-8591.

Procedure

1. Brainstorm various techniques used to promote products on television, radio, and in print. Bring examples from magazines to class. Examples:

- The use of vague pronouns
- Flashy packaging
- Convenience
- "New and improved"
- Status symbols/conspicuous consumption
- "Band wagon," everybody has one
- "Keeping up with the Joneses"
- Famous or glamorous people promoting product
- Improving self-image (by using products associated with glamorous people)
- Symbols or repeated images

2. Distribute the survey sheet and review.

3. Have students complete a second chart quantifying the advertising techniques used in one hour of television programming.

4. Have students compare their charts for similarities and differences.

5. Discuss:

a. Which techniques are used most often?

b. Which techniques that were not on our list did you identify?

c. How often were recyclability, product durability, good effect on the environment, or waste reduction promoted as positive product attributes?

Extension

1. Discuss: Does advertising work? Is advertising effective in getting people to buy certain products?

Judging from your survey, are advertisers concerned about the effects their products will have on the environment? Are advertisers concerned about waste reduction?

How do you think consumers would react to advertising that included product durability, recycling, and waste reduction as selling points?

Survey Sheet

Name of product	Television	Radio	Magazines	Newspapers	Status	New & improved	Convenience	Symbols	Famous people	Flashy packaging	Self-image	Recyclability/waste reduction mentioned	Recyclability/waste reduction implied (longevity, etc.)

Reprinted with permission from: *Here Today, Here Tomorrow,* New Jersey Department of Environmental Protection, Division of Solid Waste Management, CN 414, Trenton, NJ 08625-8591.

Paying the True Price of Pop

Procedure

1. Bring pop containers made of different materials to class to help you focus your inquiry on real objects.

Discuss:

Of what materials are your containers made?

How might this determine how you should dispose of them?

What do you think are the best ways to manage the future of your containers? Why?

How much of the cost of the pop do you think is packaging, and how much is the cost of the pop itself?

2. Study the information in the chart, "The True Price of Pop."

Discuss:

How much of the cost of the pop is packaging?

How do you feel about paying for the packaging?

Who do you think should be responsible for its disposal?

3. List possible costs and benefits of disposing of your containers. Consider waste management impacts on economics, environment, energy use, jobs, etc. For example:

Do the manufacturer and retailer of your containers pay for disposal, or is this cost passed on to you, the consumer? What do you think are their main concerns when they manufacture and sell your pop containers?

What impacts might the disposal of your containers have on the environment? Who pays for the environmental impacts of waste disposal?

If you are concerned about reducing solid waste in your town, then which container(s) would you buy?

Going Beyond

Investigate how your town disposes of its solid waste. How much is landfilled? recycled? composted? incinerated? What plans does your town have for handling solid waste in the future? What do you think about these plans?

Contact your trash collector to find out the total costs of collection, transportation, and disposal per ton of solid waste.

Discuss:

If your family produces two tons of trash each year (the average amount produced per family of five), then how much should your family pay for trash removal service?

How much does your family pay each year for trash service?

Do you think the cost for care of your solid waste is reasonable or unreasonable? Why?

Would you be willing to pay more to dispose of your trash? Why or why not?

How does the amount your family pays for trash service compare with the amount it pays for water or sewage services?

Would you be willing to recycle some household trash items if your town made it easy (e.g., curbside pickup of newspaper, glass, aluminum and plastic)?

Investigate how society subsidizes some methods of handling waste. What do you think about such subsidies? For example:

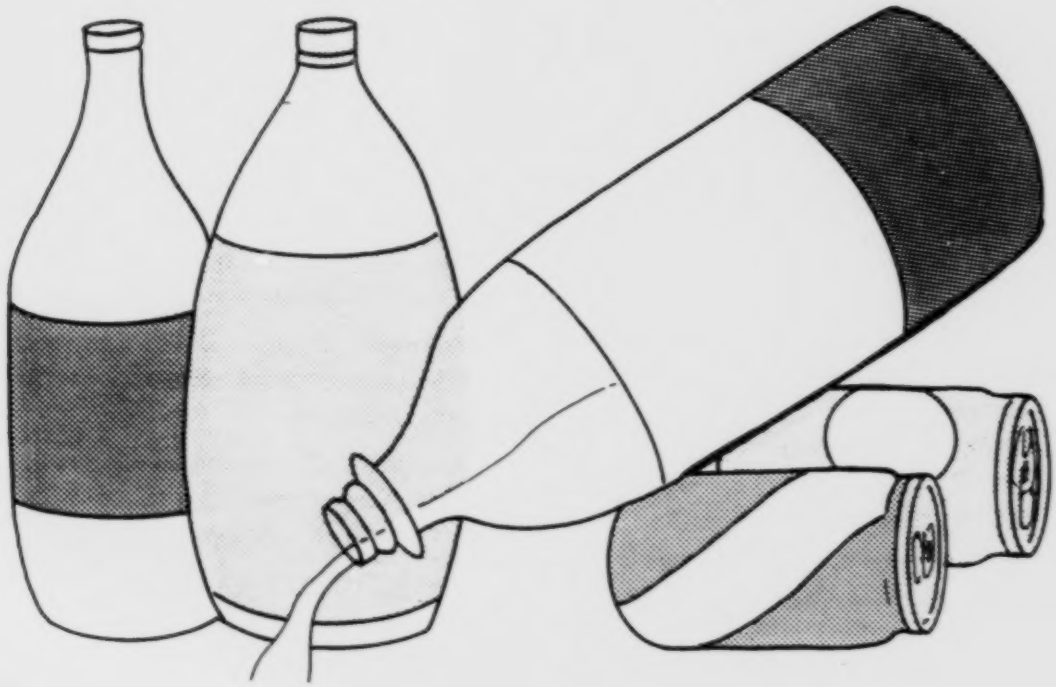
Do your property taxes fully cover the cost of your local landfill?

Does government give tax breaks to people who grow trees to be used for making paper? Are similar tax breaks given to people who use recycled paper (instead of trees) to make new paper?

How many of your tax dollars are spent on educating citizens about recycling and composting?

The True Price of Pop (per 16-ounce serving)

Container	Cost to Consumer (cents)	Energy to make, transport, etc. (oz. of gas equivalent)	Solid Waste crushed $(in)^3$
Returnable glass bottle	21	1.4 oz.	1.4 $in.^3$
Nonreturnable glass bottle	35	6.3 oz.	5.8 $in.^3$
Plastic bottle	40	3.1 oz.	7.0 $in.^3$
Aluminum can	48	8.5 oz.	4.0 $in.^3$



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What Can I Do to Change Packaging?

Goal

To have students identify steps that can be taken to affect the packaging options available in the marketplace and encourage them to act on an option.

Subjects

Language arts, social studies, environmental education.

Adapted with permission from: Wisconsin Department of Natural Resources, Bureau of Solid Waste Information and Education, P.O. Box 7921, Madison, WI 53707.

Procedure

1. Brainstorm what you can do to encourage change in packaging procedures. List your ideas. For example:

Write letters encouraging retailers to carry beverage containers that can be returned or recycled.

Write to the manufacturers of an item with a particularly wasteful package and ask them to suggest ways you can reuse or recycle the packaging they are producing.

Write to legislators urging them to require standardization of materials of which containers are made. This would make possible an expanded system of returnable or recyclable containers.

Organize a consumer's advisory committee to recommend packaging or bagging changes in your local supermarket.

If you are dissatisfied with a product's packaging, write the manufacturer and send a copy to the local Consumer Protection Division of the federal government or appropriate agency.

Write to packaging companies urging them to use recyclable materials.

(For all of the above, be sure to request a response to your letters.)

Refuse to purchase overpackaged items in stores and tell the manager why.

Refuse to accept bags and extra wrappings from the store cashier and bagger and tell them why.

2. Do some of the things you suggest.

3. Evaluate your results.

Discuss:

Did you receive a response to your letter? If not, send another copy.

Did the response you received address your concerns and answer your questions adequately?

Do you feel that your action has had an influence on reducing unnecessary packaging or encouraging use of recyclable materials?

Remember, even if your influence was small, every "drop in the bucket" counts.

Who can you contact to assist you in your goal?

Would you personally be willing to do without the conveniences and appeals of packaging? Why or why not?

Going Beyond

Read the following true-life scenarios. Based on what you now know about how packaging creates solid waste and how consumers are influenced by advertising, convenience, etc., analyze and discuss what is going on in each scenario. How do you think people in these scenarios might behave differently to reduce the amount of trash they discard?

Scenario 1:

Mr. Jones and his young son, Sammy, are at the convenience store to buy a gallon of milk. Mr. Jones picks up the plastic jug of milk and heads for the checkout. In the meantime, Sammy has been eyeing the candy and asks if he can have some. Mr. Jones says yes, and Sammy places his choice (individually wrapped jawbreakers) on the counter. The clerk rings up the purchase and puts the milk jug in a paper bag. Sammy demands his own bag for his candy, and the clerk looks questioningly at Mr. Jones. Mr. Jones nods to the clerk who gives Sammy his own bag. Once out of the store, Sammy takes his candy out of the bag and throws the bag away. Mr. Jones does the same with his bag when he gets home.

Scenario 2:

Ms. Smith has just finished mowing the lawn and asks her daughter, Kate, to help rake the grass clippings and stuff them into plastic bags. Kate also rakes up some leaves that have blown into the shrubs. Ms. Smith and Kate haul the bags to the curb for garbage collection. Their neighbor, Carol, walks by and asks why they are putting the grass and leaves in plastic bags. Kate responds that she doesn't know how else you're supposed to get rid of them —people always dispose of them that way (she points to the house across the street, whose occupants have also thrown out grass in plastic bags). And, besides, it's the way her mom asked her to do it. Ms. Smith explains that the ads on TV said bags were good to use for throwing away trash like grass and leaves. She buys the heavy-duty ones with the built-in tie because she had a coupon and because the ad said they are tough to break and easy to use.

Scenario 3:

Luke and Jennifer are on their way home from school and are starving. They stop at the fast-food restaurant for a burger, fries, and soda. They pay, pick up the bag with their order, and go to the nearby park to eat. Luke opens the bag and takes out the sodas and paper napkins. He puts a plastic straw through the plastic spillproof lid on his paper cup, then grabs for the cardboard container holding the fries. "You like ketchup?," he asks Jennifer, as he opens the plastic ketchup packet. Meanwhile, Jennifer is eating her burger, having stuffed the styrofoam box, designed to keep the burger warm, back into the bag. She adds some pepper from the little paper packet, but decides she doesn't need the salt she got, so she leaves it in the bag. When they're finished eating, Luke and Jennifer put the garbage (from two burgers, two sodas, and one order of french fries) in the trash can and head home.

Extension

Divide students into small groups.

Have students create a group scenario.

Have each group share their scenario.

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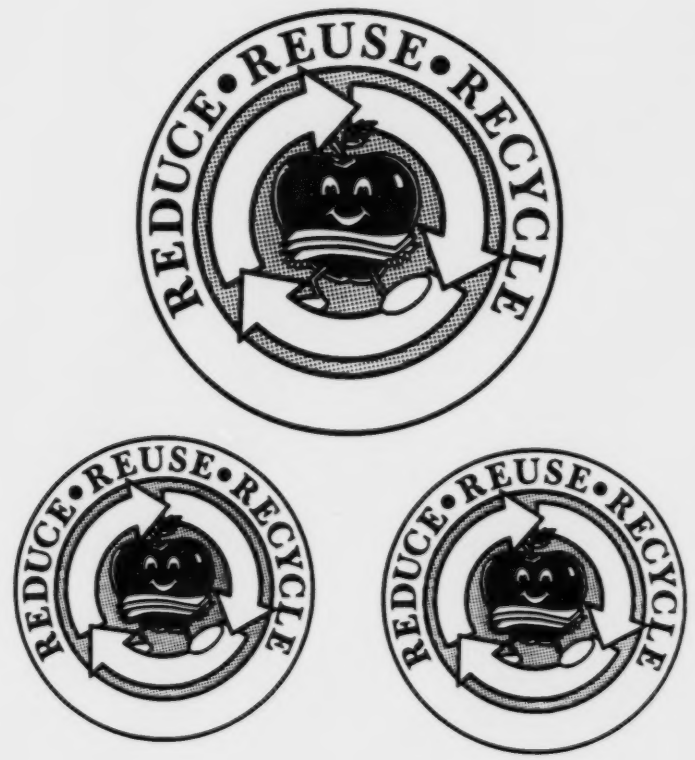
REUSE

Trash or Treasure **31**

Barter Day **33**

Biography of a Favorite Thing **35**

Crafts from Trash **37**



Trash or Treasure?

Concepts

One person's trash is another person's treasure.

Objective

Students will redefine waste as a resource by identifying when others consider trash as their treasure.

Method

Students will create a class treasure trunk.

Materials

Teacher's own reused treasure, used objects from student's home, attached poem.

Subjects

Language arts, art, social studies.

Skills

Divergent thinking, observing, classifying, valuing, experimenting.

Time

Can be set up and added to indefinitely.

Group Size

Whole class.

Vocabulary

treasure, junk, trash, value.

Adapted from the Association of Vermont Recyclers *Teacher's Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601.

Leading Question

Does everybody agree what might be trash and what might be treasure?

Procedure

1. Read the attached poem, "Hector the Collector" by Shel Silverstein. Show the class two examples of reused objects: a) an object you are reusing for its original purpose, and b) one for which you have created a new use.

2. Ask the children to bring from home a treasured object that they have rescued from the trash. It can be something they have reused either for the same or for a new purpose. If they cannot find one, ask them to bring an item for which they have a reuse idea.

3. Have the students show and tell about their objects, describing to the class why they are treasured.

4. Discuss the benefits of reusing things. It is fun and creative. It saves us money because we don't have to buy something new, and we don't have to pay to have it thrown out. It saves space in our landfills. It helps reduce pollution and saves the natural resource which was used to make the original object.

5. Use an old box to create a class treasure trunk. Decorate it with salvaged paper or fabric scraps and fill it with the collected treasures.

Evaluation

Extensions

A. Imagine and describe a planet full of creatures who consider the things we throw away as their most treasured possessions.

B. Have each student write a poem or story about an item they treasure that others consider junk.

C. Have a class or school swap day so that people can exchange trash for treasure.

D. Use old greeting cards—to make new ones and as story starters.

Hector the Collector

by Shel Silverstein

Hector the Collector
Collected bits of string,
Collected dolls with broken heads
And rusty bells that would not ring.
Pieces out of picture puzzles,
Bent-up nails and ice-cream sticks,
Twists of wires, worn-out tires,
Paper bags and broken bricks,
Old chipped vases, half shoelaces,
Gatlin' guns that wouldn't shoot,
Leaky boats that wouldn't float
And stopped-up horns that wouldn't toot.
Butter knives that had no handles,
Copper keys that fit no locks,
Rings that were too small for fingers,
Dried up leaves and patched-up socks.
Worn-out belts that had no tracks,
Airplane models, broken bottles,
Three-legged chairs and cups with cracks.
Hector the Collector
Loved these things with all his soul
Loved them more than shining diamonds,
Loved them more than glistenin' gold.
Hector called to all the people,
"Come and share my treasure trunk!"
And all the silly sightless people
Came and looked . . . and called it junk.

Text and illustrations from Shel Silverstein, *Where the Sidewalk Ends*, (c) 1974 by Shel Silverstein. Reprinted by permission from Harper & Row Publishers, Inc.

Barter Day

Subjects

Social studies or art.

Materials

30 letters to parents.

Students provide items or services to be bartered.

Background

A part of revising consumer habits is buying less. A part of buying less can be trading unwanted items for wanted items — known as bartering. Bartering has always been an important method of obtaining needed goods. People did not always use paper money and coins to "buy" things. There are still societies in the world that do not use what we call "money" or "currency" to exchange for goods and services.

Learning Objective

By participating in a class Barter Day, students will see that bartering is a good alternative to discarding unwanted items. Students will also be saving valuable natural resources that might otherwise end up in a landfill.

Learning Procedure

1. Lead a classroom discussion dealing with the following concepts:

a. The world has finite resources.

b. We are rapidly using up some of these resources.

c. If we can trade things rather than buy things, we conserve natural resources.

2. Organize a swap meet.

a. Discuss what bartering is: (role play, if necessary, to demonstrate). Ask students to think about what they can barter.

b. Set guidelines for parental permission to trade objects.

c. Trades can include intangibles or services such as guitar lessons, tutoring, time on a friend's bicycle, or working on a friend's computer.

d. Emphasize bartering as a solution to the problem of solid waste and as a way to conserve natural resources. Ask your students how a swap meet can help serve this purpose. List responses on the blackboard.

e. Optional: Working with students, draw up a simple contract for trades involving intangible items or services.

3. Hold your Barter Day swap meet.

a. Have students circulate and trade individually.

b. Have students keep a list of what was bartered and what resources were saved because of the swap meet. Discuss opportunities in daily life to trade items (garage and yard sales, individual exchanges, notification on bulletin boards in public places, community festivals, etc.).

Adapted with permission from: *Let's Put Waste in Place,* Philadelphia School District, PhilaPride, Inc., 123 S. Broad Street, Suite 1326, Philadelphia, PA 19109.

BARTER DAY

SWAP MEET

Biography of a Favorite Thing

Subject

Science, art, social studies, math.

Grades

4-6

Teaching Time

30 minutes.

Focus

Waste reduction, reuse.

Rationale

A tree is a natural resource that has many energy inputs from seedling to manufactured product. Some of the energy and resources used in the energy input steps are partially lost if the item is not reused.

Learning Objective

Students will:

recognize the energy and natural resources used in the making of their favorite possessions and the waste involved when they are discarded.

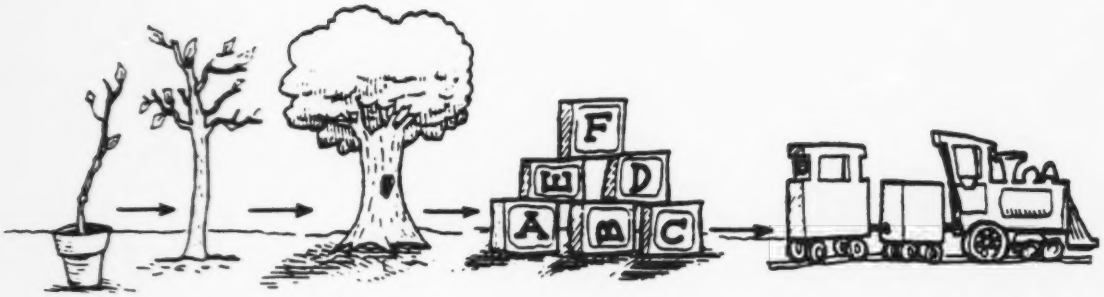
Materials

Teacher brings a favorite object that is a forest product.

Pre- and Post-Test Questions

1. Can you name three objects in the classroom made from trees?

2. What is an "energy input?"



Learning Procedure

1. Ask students to pick out a favorite object in their life which is a forest product. Examples: surfboard, skateboard, wall poster, kite, clogs, and book.

2. Invite students to trace the making of their favorite thing back to its origins. Encourage them to find out whether the possessions are entirely forest products. Ask the students to list any resources and energy sources which were used in the manufacturing of each item and in transporting the materials to make the object. Then ask the students to make pictures representing all the material and energy input in the entire journey of their objects, from the forest to its present location. (One could create a wall mural starting with photosynthesis!)

3. Ask each of the students to count the number of times there was an input of energy in the total production and transportation of their favorite thing.

4. Ask students to include in the pictures what will happen to favorite things when they are no longer wanted. The student can determine the life expectancy of their objects.

5. Ask, "What good uses are there for your favorite possession rather than throwing it away?" "If you throw it away, what will happen to all the energy and resources used in its production?"

Extended Learning

Calculate the energy resources necessary to produce a larger forest product (e.g., a wood structure such as a house or log cabin).

Adapted with permission from *A-Way with Waste*, Department of Ecology, 4350 - 150th Avenue, NE, Redmond, WA 98502.

Crafts from Trash

Age

5-12 years old.

Goals

To help children learn that many items can have more than one use and that the longer you keep an item out of the waste stream, the better it is for the environment.

Background

Many containers can have their "lives" and usefulness extended by finding creative ways to reuse them. In this activity, children will learn to make toys, musical instruments, piggy banks, and bird feeders from common household trash.

Recycle for the Birds

Materials:

clean household containers:

- milk, detergent and bleach bottles
- milk cartons
- coffee cans
- pie tins
- onion sacks

mustard jar lid (for tracing circles)

sticks or dowels (for perches)

knife

hammer

nails

wire cutters

pencils

ruler

light wire

coat hangers

Procedure

1. Create bird feeders out of clean household containers using the drawings for models. Assist younger children with the cutting. Remember to punch small drain holes in the bottom of the containers to let rain water out.

2. Discuss with your group the proper location for installing the feeders and the types of bird feed to put into each container. Inform the group of their responsibility for maintaining a continuous supply of food once feeding is started and the importance of keeping the feeders clean.

3. Discuss the importance of reusing materials and develop a list of common items that can be reused and the new use(s) for each.

Going Beyond

Design and create bird houses out of natural or manmade containers.

Provide string, old yarn, baler twine, cloth strips, etc., for nesting materials. Wind these through an onion sack and hang the sack on a coat hanger.

Donate feeders to nursing homes and maintain them.

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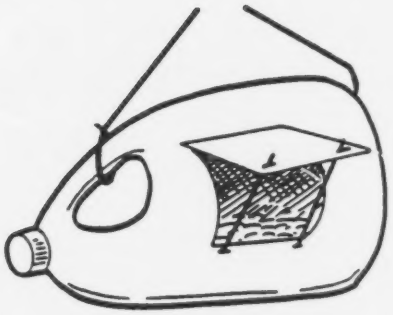
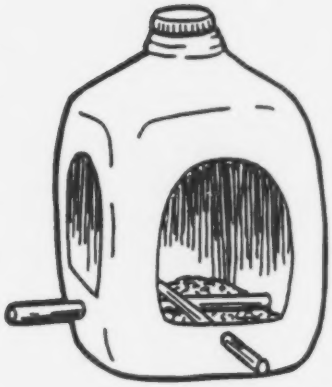
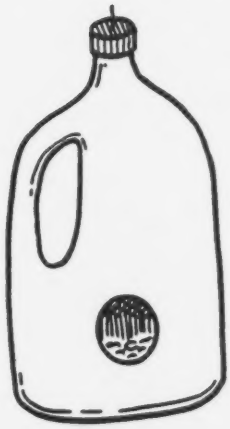


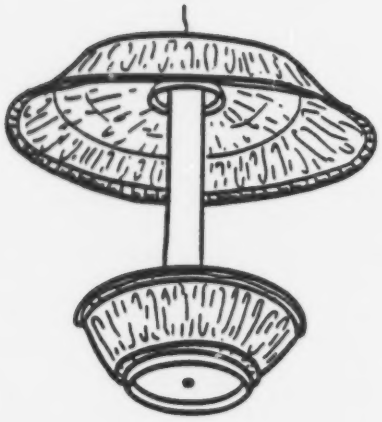
Bleach bottle feeder



Milk jug feeder

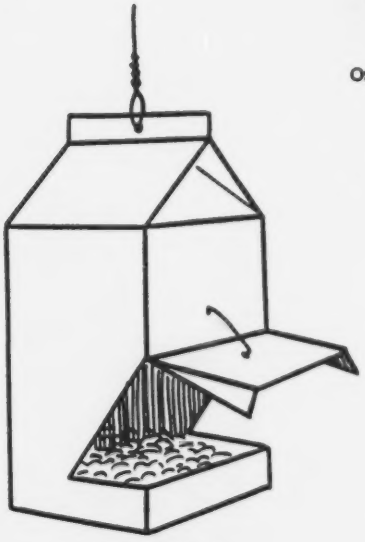


Detergent bottle feeder

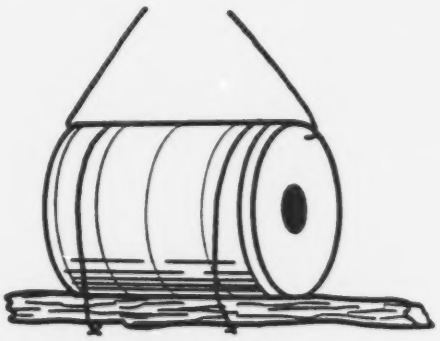


Pie plate feeder

Onion sack suet feeder



Milk carton feeder



Coffee can feeder

RECYCLE

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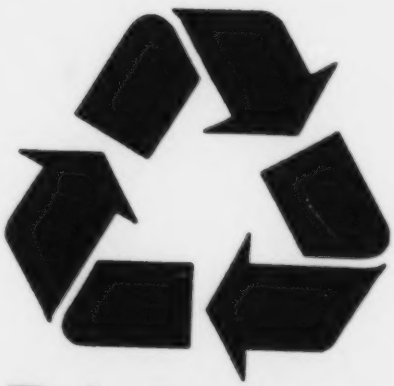
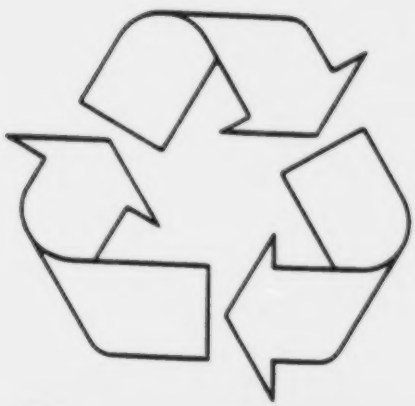


Printed on recycled paper



Recyclable

The Throwaway Three – A Skit

Subject

Social studies, language arts, drama.

Grades

4-6

Teaching Time

Two 40-minute sessions.

Focus

Litter control, recycling.

Rationale

We can't throw away our trash. There simply is no such place as "away." Care is always required to prevent our trash from having bad effects on our lives.

We can't burn it all. Most of the burning requires expensive and often elaborate controls to prevent air pollution. There is always ash or something left over which must be buried.

We can't bury it all. Not enough places are available. Besides, plastics and modern synthetics do not rot when buried.

We are literally running out of some natural resources so that any form of disposal of certain goods is self-defeating.

Materials

Skit script, props

Learning Objective

Students will:

become aware that historical methods of getting rid of solid waste (throw it away, bury it, or burn it) won't solve modern urban garbage problems.

Pre-and Post-Test Questions

List three waste disposal problems today's society must solve which did not exist 100 years ago.

Explain how this skit helped you find ways to solve your waste problems.

Who were litter makers in this skit?

Learning Procedure

1. Prepare materials as described in the skit script on the following sheets. Encourage students to make props and costumes from recycled or reused materials.

2. Work with students to develop a production which could be performed for other classes, for parents, or for a group in the community.

Source: *A-Way with Waste.*

The Throwaway Three

Person 1 — **Props**

This is the tale of the Throwaway Three,
Of Man and his Garbage throughout his-to-ry:
Now they're very nice people, just like you and me,
Who all have a problem, as you will soon see—
What shall they do with their garbage and trash?

All

Why, throw it! Or bury it! Or burn it to ash!

90,000 BC (Monkey) — Monkey masks

I represent when we lived in a tree. — Banana peel
I get rid of garbage so easily!
It's a snap! It's no problem—to me or to him.
We just let go, plop! Down through the limbs.

Person 3 — 50,000 BC (Cave dweller)

I am a cave dweller who lives on the ground. — Skins
What do I do with old stuff all around?
Why, burn it, like meat; burn it up in the fire;
Or bury it like bones, in the muck and the mire.

All

Yes, throw it, or bury it, or burn it to ash!
That's how we always get rid of our trash!

Person 1 — 200 BC (Roman)

I am a Roman who lives in the town. — Roman helmet
Our laws won't allow me to just throw it down. — Bag of trash
I have to drag it away for a mile
And then I can dump it, forget it, and smile!

Person 2 — 1200 AD (Briton)

I am a Briton, wary and quick; — Stack of trash

Down on our street it can get pretty thick.

When housewives up there want to pitch out their goo,

They just leave it out there and yell: "Gardy-loo!"

(Person 1 stands on chair and yells, "Gardy-loo!")

It will stay there and stay there until the next rain,

Or until our fair London should burn down again.

All

Oh, what do we do with our garbage and trash:

We throw it, or bury it, or burn it to ash!

Person 2 (Industrialist)

We make instant menus that come in a pack. — Plastic bag

You just boil the food in its own plastic sack. — TV dinner

Or our TV dinner in its tinfoil tray,

It's quick; you don't wash it; just throw it away!

Person 3 (Scientist)

We make lots of TVs and clothes dryers, too. — Broken small appliance

Don't ask for a trade-in; you're kidding, aren't you?

Person 2 (Industrialist)

Our new cars all change with each model year, — Toy car

Don't try to repair them, the cost's much too dear.

Besides, we don't bother to make last year's parts

For Skylarks, or Novas, or Cougars, or Darts.

Person 3 (Scientist)

It's the New Thing, the New that America craves.

So out, out with old stuff, away to its graves.

Person 2 (Industrialist)

So what if there're more of us buying more goods?

So what if they won't rot away as they should?

Person 1 (Indian)

Indian headband

Now wait just a minute! You cannot fail

To include me in your historic trash tale.

We Indians lived simply, on prairies, in woods,

We made no high trash piles, nor mass-produced goods.

Let me be your critic, show you where you stand;

And tell you just how you're defiling our land.

Your new-fangled goods will not rot away.

When you throw them all down, they remain where they lay.

Then you say you will bury them deep in the ground:

All your urban trash will make quite a mound!

So then you would burn it, in smoldering masses

And fill up our air with smoke, deadly gases!

Oh, all of your answers have faults everywhere:

You'll either ruin the water, the land, or the air.

What's more, your resources—your lumber, your ore—

Get smaller each year than the year before.

And what's more—this old earth's not making any more.

Person 2 (Industrialist)

Throw-out old blanket and cola bottle

You're right. Our resources are shrinking away

While our garbage problem grows bigger each day.

We're always converting resources to refuse

Instead of recycling them for reuse!

Person 3 — 1630 (Settler)

Pilgrim hat

I am the settler. I came without much,

But everything else I must make with my hands.

So I don't throw out much—I use all I can.

Cloth scraps become quilts; I reuse my bent nails.

It will be a long time 'fore the next trade ship sails.

Person 1 — 1700 (Colonist)

I am a colonist; now life's not so tough.

We have trade between cities that brings lots of stuff,

And some things are made by our townsfolk today.

I could buy a new harness, throw this old one away.

We have pigs and hogs running loose on the street,

If I toss it out there; they'll eat it up neat!

Or I might bury it right over there.

Or I might burn it; nobody would care.

You see; the New World is the same as the Old!

We trashmakers come from the time-honored mold.

Coonskin hat

Leather

All

What are we still doing with garbage and trash?

You guessed it! Throw it, or bury it, or burn it to ash!

Person 2 — 1890 (Industrialist)

I'm the industrial person and new on the scene,

I mass-produce goods with my trusty machine.

This sweater, handmade, took a week in days of yore,

But now in one hour, I can make forty-four.

I make things so cheaply, you can now afford two

And throw out twice as much trash as you need to do.

Engineer's cap

3 sweaters (One handmade; two machine-made)

Person 3 — 1950 (Scientist)

I am the scientific person in the new post-war age.

We've learned a few tricks while the war shortage raged.

When we couldn't get natural stuff to process,

We invented synthetics to replace the rest.

Lab coat

Person 2 (Industrialist)

Rayons and nylons, acrylics and plastics,

For furniture and clothing and even elastics:

Forget your old woolens and silks and your cotton;

Real wooden toys and washboards are forgotten.

Nylon stockings

Plastic bags and containers

Person 1 (Scientist)

Our new stuff will last 'til forever, you see,

Even when it's worn out to you and to me.

Permanent pressed, presized and preshrunk

When dingy and old, it's still permanent "junk."

(Person 1 yells, "Junk")

Permapressed shirt

Person 3 (Scientist)

Oh stop it! Don't drop it! We'll think of a way

To make food for cows that's much better than hay.

Don't burn it, return it—we'll make something new,

A vase for your mother, a spyglass for you.

(Flower in bottle for vase, flower out, bottle held up to eye for spyglass)

Don't bury it, carry it—back to the mill.

We'll make a new blanket to ward off the chill.

(Pick up old blanket and wrap around shoulders)

Pick up orange peels

Clear bottle

Flower

Person 2 (Industrialist)

It's time we progress past the Disposal Age

And make recycling the popular rage!

We'll have to give up old solutions for trash

And all realize that it's pure balderdash—to just

All

Throw it, or bury it, or burn it to ash!

The Throwaway Three – Discussion

The skit shows children that people have historically gotten rid of solid waste successfully by throwing it out, burying it, or burning it. But none of these methods solves modern urban garbage problems. The discussion should attempt to reinforce this concept. One way this can be done is to discuss the characters in the skit: how they disposed of their garbage or trash and why their method of doing so was either satisfactory or not satisfactory.

Monkey

Threw it down. No problem developed because no large concentration of monkeys existed.

Cave dweller

Threw it, burned it, buried it. These acts still did not cause a problem for the same reasons.

Roman

Threw it. Tossing out garbage began to be a problem because of the many people who lived in cities, but it was easily solved by taking the garbage out of the city.

Briton

Threw it. A problem grew because more and more people moved to the cities, thus producing more trash than they could get rid of in the city.

Settler

Had virtually no garbage.

Colonist

Threw it, burned it, buried it. With greater trade, there were more things to be discarded.

Industrialist

With a greater concentration of people in cities than ever before and more buying because machine-made goods were cheaper, much more was thrown out.

Scientist

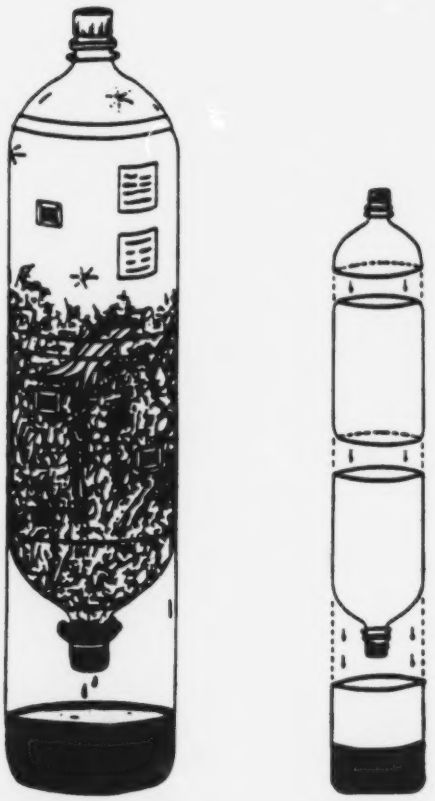
The big change to synthetics plus the use of enormous amounts of natural resources are causing tremendous problems.

Compost Column

Introduction

Composting, which is based on the biological process of decomposition, is a fascinating educational activity. When people make composting piles and bins of organic material, they encourage the natural process of rotting, and the result — compost — is a dark, earthy-smelling, crumbly material that is the best natural fertilizer in the world. Composting returns organic wastes to the earth, recycling them for use by other forms of life.

What turns dead plants and animals into compost? Microscopic bacteria and fungi, which feed on dead tissue, are the chief agents. These organisms are everywhere — in the air, on the leaves of plants, and in the soil. Different kinds specialize in breaking down particular types of tissue, and certain varieties thrive early in the rotting process while others come along at the end to finish the job. Their activity releases a variety of nutrients, as well as water, gases, and heat. How many different kinds and colors of fungi and bacteria can you see — and when do they appear — in your column?



What affects the composting process? The amount of moisture and air, temperature, light, source of bacteria and fungi, and the nature of the decomposing material are all critical. Soft banana peels and lettuce, for example, will rot and make compost many times faster than a piece of wood under ordinary conditions. Old banana peels kept in the freezer, on the other hand, will decompose much more slowly than a piece of wood in a warm, moist place. How can you vary the conditions which affect your column?

The presence or absence of air (oxygen) is one of the most important factors in composting. Modern landfills seal garbage deep in the earth, excluding air and moisture, preventing microorganisms from doing their work. It is said that the newspapers we bury today in a landfill will still be readable 75 years from now. A paper bag may be more biodegradable than a plastic bag, but in a sealed landfill, neither will decompose fully for hundreds of years. The practice of composting, in contrast, allows air and moisture to speed the natural process of biodegradation. Making a composting column lets you see this process and witness nature's world of recycling.

Making Your Own

The basic column design requires making a hollow cylinder that will hold the materials to be composted. It can be made from one or more empty soda bottles. An additional bottle is needed to hold the column upright and to catch drippings. These instructions show how to make a two-bottle column.

1990 Bottle Biology Resources Network, 1630 Linden Dr., Madison, WI 53706, (608)263-5645, University of Wisconsin, Madison.

Materials:

Three 2-liter plastic beverage bottles

Bottle Basics tools: marking pen, knife or razor blade, scissors, hot water, sharp needles for poking holes, clear tape, plastic electrical tape.

Netting or mesh fabric, rubber band.

Organic material for composting, such as kitchen scraps, leaves, newspapers, and grass clippings. Why might it be best to avoid materials of animal origin?

Remove the bottle bases from two bottles and the labels from all three. Cut them as illustrated (see following page), and assemble. Most columns will require air holes for ventilation, and these can be poked into the plastic with a sharp cold needle or with a needle heated in candle flame. Alternately, a larger hole can be cut into the sides with a knife and covered with a fine fabric mesh, held in place with tape.

Explorations

The possibilities for compost column discoveries are endless. There is no limit to what can be put inside or the conditions under which the column can be kept. In addition to simply observing changes, you can design experiments which explore the effects of variables on your column. Here are two ideas.

• Make two identical columns, and fill each with a know quantity of shredded newspaper. Use a bottle balance to determine the weight of the paper. On top of one column, add a handful of garden soil — which is naturally loaded with microorganisms. Pour equal amounts of rainwater into each column, and wait several hours for it to percolate through. If none comes out the bottom, add more in equal amounts until about a half cup drips into the base. Schedule a rain storm to occur in the column every few days. Which column decomposes faster and why?

• Compost columns can be used to produce a liquid fertilizer, called "Compost Tea." You might try making several columns with different contents whose drippings are likely to differ in color and chemistry. Use this liquid to water and fertilize identical sets of seedlings to see which brand of "tea" induces the fastest growth. How much water should be poured through the column, how often will you recycle the drippings, and how often (if at all) should the column get new ingredients? Can you be sure that the "tea" and not some other factor was responsible for the plant growth you observe?

Notes from the Field

• At the beginning of each school year, Ann Croal's first-grade class makes a compost column which is continuously filled throughout the year. This year her kids named it "Mother Nature's Stew." Though she asks for contributions that would make good compost, both organic and inorganic ingredients get added. During the last week of school they spread out a plastic sheet and dump the remains, and the students root around with tongue depressors to see what's left. Lots of discussion occurs, of course, which Ann guides toward concepts of nature and human nature. She finds that this activity is especially intriguing in autumn, when the newly fallen leaves are beginning to decay. "What you see happening in nature," she says, "is what you're doing in the compost column." (From Ann Croal, who teaches first grade in Madison, Wisconsin.)

• In a science methods class at a university, 90 future elementary teachers each make a column which they take home to observe. Teams of four students each construct group columns as well, and these are left in the classroom for study. Throughout the semester, they make many discoveries — that overly large vent holes let water leak out the sides, that the strong smells of the first few weeks do disappear, and that columns with nonbiodegradable contents are boring to watch. Weekly observations are logged into a notebook in the classroom, to be read by all. (This activity was developed by Betty Downs at the University of Wisconsin—Madison.)

References:

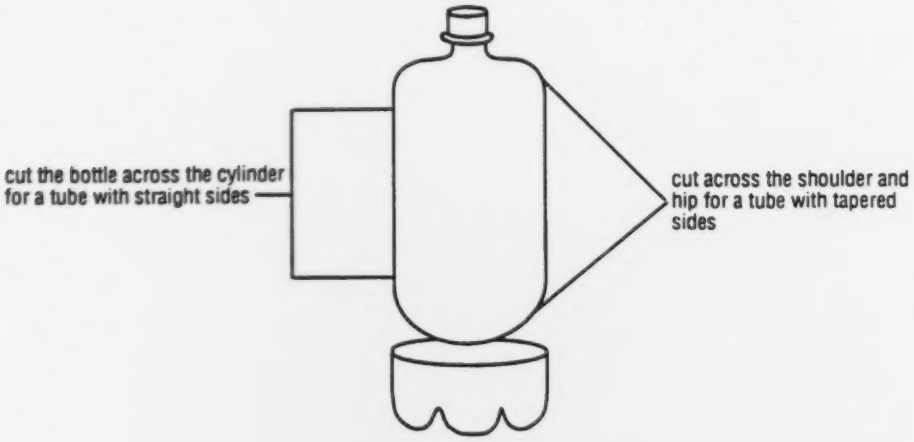
Minnich, Jerry, and Marjorie Hunt. 1979. The Rodale Guide to Composting. Emmaus, PA: Rodale Press.

Catton, C., and J. Gray. 1984. The Incredible Heap. New York: St. Martin's Press.

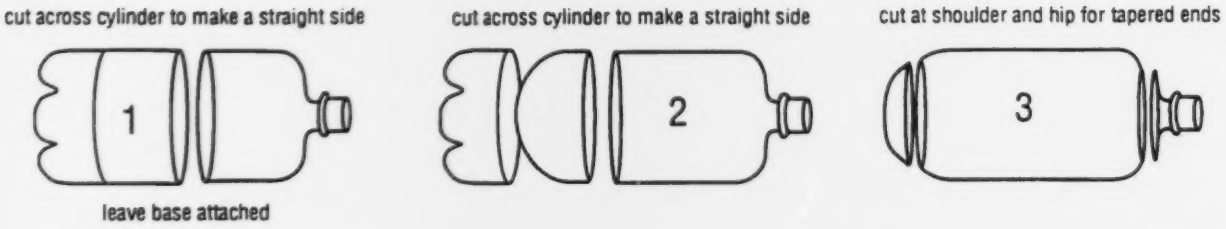
Kreuter, M. 1985. The Macmillan Book of Organic Gardening. New York: Macmillan.

Compost Column (2-Bottle version)

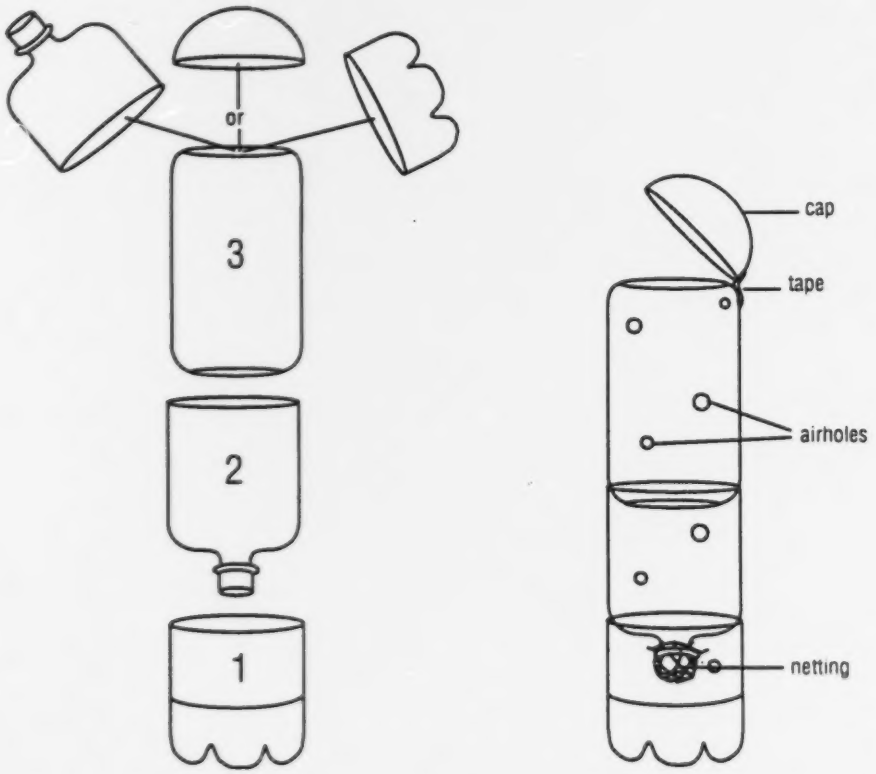
Recycle! All column components and unused parts are recyclable.


cut the bottle across the cylinder for a tube with straight sides
cut across the shoulder and hip for a tube with tapered sides

parts


cut across cylinder to make a straight side
cut across cylinder to make a straight side
cut at shoulder and hip for tapered ends
1
2
3
leave base attached

assembly



Creative Compost Column Observation Chart

Date	Temperature (C°)	Odor (if any)	Amount of Water in Column Bottom (ml.)	Evidence of Organisms	Observations

52

Make Your Own Paper

Age

5-12 years old.

Goals

To show children that used paper can be recycled into new paper.

Materials:

a blender or egg beater and bowl

a flat dish or pan, a little larger than the screen

a round jar or rolling pin

per child:

- 10 pieces of tissue or newsprint
- a piece of nonrusting screen
- 4 pieces of blotting paper or felt the size of the screen
- newspaper and blotting paper
- 2 cups of hot water
- 2 teaspoons of instant starch

Background

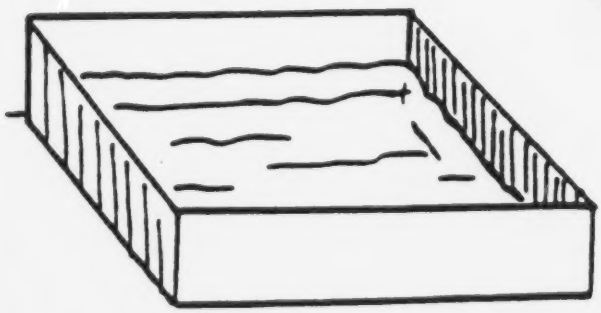
What happens to used paper? Most paper is thrown away in landfills or is burned. If we recycle paper, we save landfill space and utilize valuable wood fibers over again.

Making your own paper from old paper is similar to what happens in a paper recycling mill. At a mill the pulp is put into a machine with a long moving screen. The water drips through the screen. Then the screen moves through parts of the machine that press and dry the pulp. The final product is new paper.

The paper you make will be much thicker and rougher than recycled paper made in a mill. Paper mills have many kinds of machines to make the paper smooth and flat.

If time is limited, most of the pulp can be prepared the night before. If you make it much in advance, it should be refrigerated to prevent fermentation.

To make special-occasion paper, add colored threads or dried flowers and leaves to the completed pulp.



Procedure

1. Tear the newspaper into very small bits. Add two cups of hot water to 1/2 cup of shredded paper.

2. Beat the paper and water in the blender or with the egg beater to make pulp. Mix in the starch. Completed pulp should be the consistency of split pea soup.

3. Pour the pulp into the flat pan.

4. Slide the screen into the bottom of the pan and move it around until it is evenly covered with pulp.

5. Lift the screen out carefully. Hold it level and let it drain for a minute.

6. Put the screen, pulp-side up, on a blotter on some newspaper. Put another blotter over the pulp and more newspaper over that.

7. Roll a jar or rolling pin over the "sandwich" to squeeze out the rest of the water.

8. Take off the top newspaper. Turn the blotter sandwich over. Then take off the blotter and the screen very carefully. Do not move the pulp. Voilà!! There is your paper!

9. Put a dry blotter on the pulp and let the paper dry for 24 hours.

Going Beyond

1. Ask the children to speculate how much paper they use in one day (napkins, lunch bags, school work, paper cups, newspaper, etc.). What would life be like without all of these products?

2. Encourage the children to use the paper they made in another art project.

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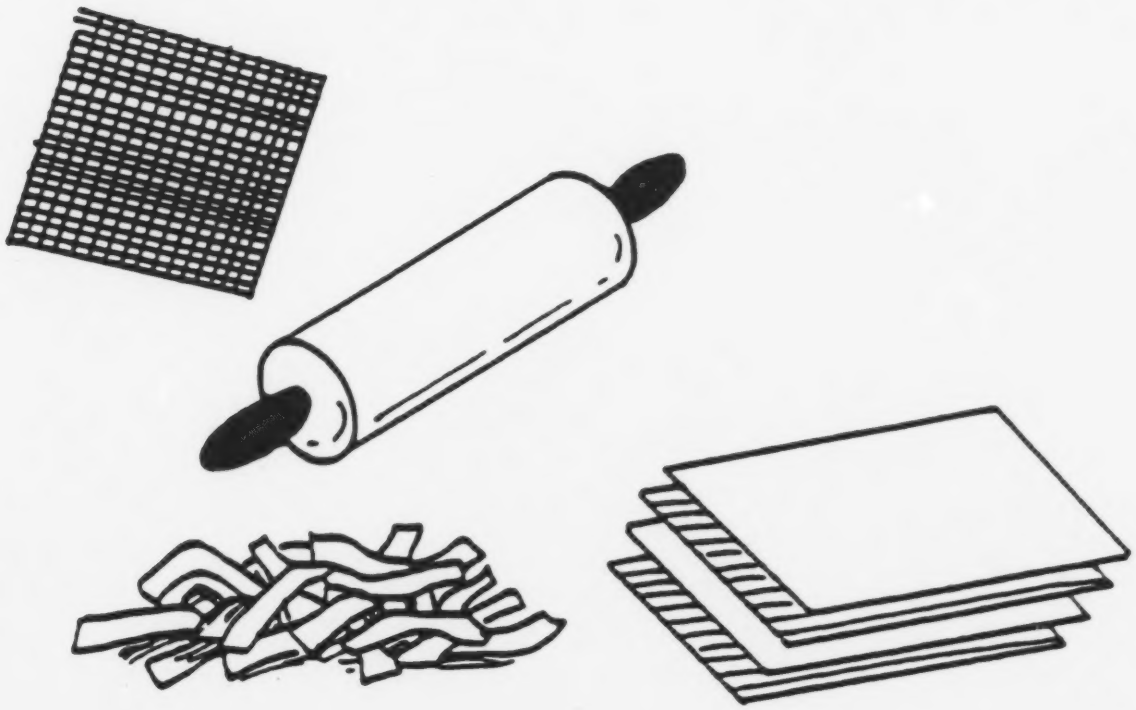


How to Set Up Your Home Recycling Center

Setting up and maintaining your home recycling center can be a fast, easy process. The time required for the average household is only about 73 minutes per month — a little more than two minutes per day.

The following are the basic steps for establishing your home recycling center:

1. Find a convenient place in your home or apartment for the center.

It doesn't take much room — storage of glass, cans, and newspaper for a month usually takes a 3' x 3' area.

The garage, a storage closet, a kitchen corner, and under the sink are good storage places.

2. Find containers for storing the materials.

Three plastic buckets, paper boxes, or grocery bags can be used — one each for paper, cans, and glass.

3. Locate the recycling center nearest to your home.

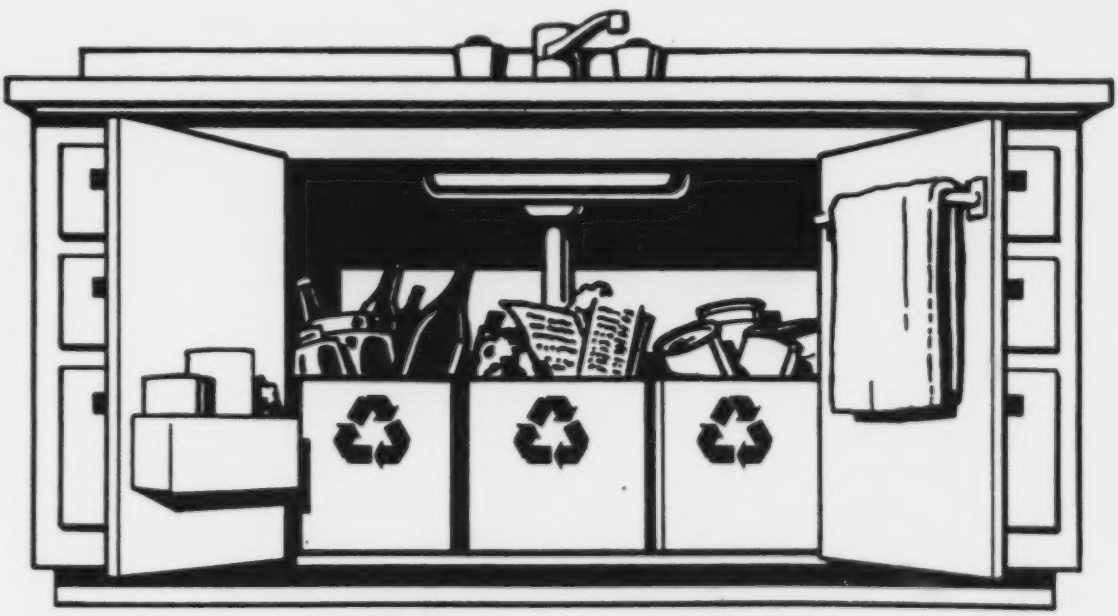
Your county may have a designated contact to help with this. Find out:

a. if the recycling center is a donation or buy-back center;

b. exactly which materials the center will take;

c. how you should prepare your recyclables before you bring them in. Some recyclers require that all cans be crushed before you bring them in. Some require that labels be removed or that jars be washed. Some ask that glass be separated by color, that newspapers be bagged, etc.

You'll find general instructions for preparing recyclables on the following page. Again, be sure to check with your local program for its requirements before you begin.



Recycle

How to Recycle Paper

Newsprint

1. Stack newspapers in fire-safe areas.

2. Check with recycler to see if newspapers should be tied in stacks and if colored inserts are acceptable.

Other Paper

1. Corrugated cardboard is two layers of cardboard with a ribbed section in between. Check with your recycler. Flatten for easy storage and transport. Store in fire-safe area.

2. High grades of paper are computer paper, tab cards, and white ledger paper.

3. Check to see what types of paper your recycler accepts.

How to Recycle Glass

As much as possible, buy returnable or reusable bottles. To prepare other glass for recycling, do the following:

1. Wash glass—no need to remove labels.

2. Check with recycler to see if it is necessary to remove all metal caps and rings. Discard caps.

3. Separate glass containers by color, either at home or at the recycling center.

How to Recycle Aluminum

1. Check to make certain the cans are all aluminum (check the label).

2. Rinse. (You may wish to flatten them to save storage.)

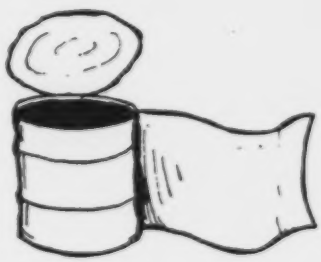
3. Separate aluminum cans from other aluminum products, TV dinner trays, foil, etc.

How to Recycle Tin Cans

These are typical food cans; they are actually 1 percent tin and about 99 percent steel.

1. Wash them out and remove labels.

2. Remove both ends (if possible) and flatten. Be careful of sharp edges. Recycle the ends as well as the cans.



"Remember: Nobody makes a greater mistake than he who did nothing because he could do only a little."
– Edmund Burke

You Can Make a Difference! Sort and save your recyclables and take them here:

	Recycling Center	Location	Hours
Aluminum			
Tin cans			
Glass			
Plastic			
Newspaper			
Paper			
Cardboard			
Motor oil			

Using the ENR *Directory of Illinois Recycling Centers*, have each student prepare a fact sheet for recycling at home. You may want to allow students additional time to visit or collect information from these recycling programs. The directory can be obtained from the ENR information Clearinghouse: (800) 252-8955.

Making Waves

Produce Your Own Radio Commercial to Promote Recycling

Improve communication skills by creating a radio announcement.

Focus in on what to tell your community about recycling.

Big Ideas

You have important things to say about recycling.

Amateurs can often use local communication media.

Planning and imagination are as important as professional training when making a radio announcement.

Needed:

at least one cassette recorder and tape

several watches with a second hand, or one-minute timers

writing materials

imagination

Teacher:

1. Collect materials and equipment.

2. Discuss steps to making a radio announcement.

3. Guide students to consider what aspects of recycling they want to focus on.

4. Break group into smaller working groups of two or three and let them create for 20 minutes to one-half hour.

5. At the end of the allotted time, bring everyone back together. Encourage silence while you record the commercials.

Students:

1. Think about what you want to say about recycling. Discuss as a group.

2. In smaller groups, decide what your original commercial will tell people about recycling.

3. Plan and make a short radio announcement.

How

1. Focus topic.

2. Plan what you will say. The announcement will only last one minute.

3. Jot down an outline or script of what to say.

4. Decide who will speak. There could be one voice or several—talking, singing a song, reciting a poem, having a conversation, or making sound effects.

5. Give it a dry run. Try to time it to last about three minutes. Edit your script if it lasts longer. Add words or speak slower if it is too short.

6. Practice several times, being careful to speak clearly.

7. Record the announcements, allowing a pause between each one. Begin each, "This is student's name(s), of school, for recycling."

Going Further

Many radio stations will help nonprofit groups produce public service announcements. After you have a good commercial, contact your local radio station. Ask them if they can use your homemade commercials, or help your class record the commercials at the station for use over the air.

Use the announcements as one part of a local campaign to promote recycling in your community. Other things to do include:

Write short articles or letters to the editor for the local newspaper.

Put posters or displays in store windows.

Arrange to be interviewed on a television or radio talk show.

Sponsor a poster contest.

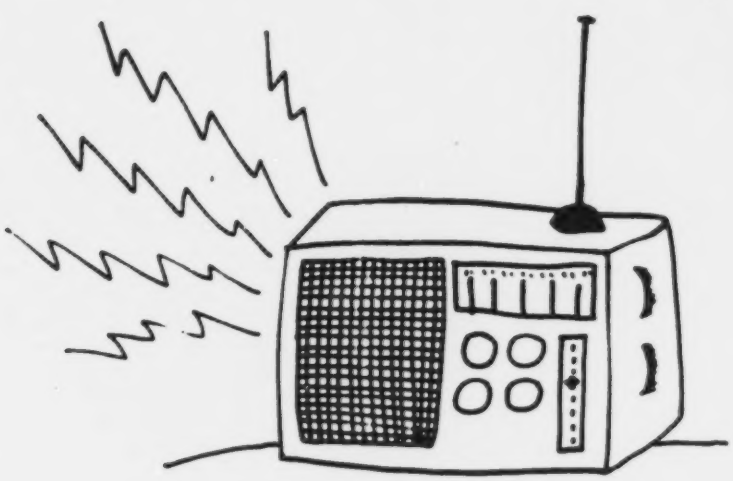
Hints

1. If the class isn't able to record its own commercials, maybe an announcer at the station can.

2. For sound effects, try out different kinds of trash before taping to see what sounds best on tape.

3. Try listening to radio or television commercials for possible ideas.

Source: *Recycle for Reuse* 4-H, Cooperative Extension Service, 328 Lowell Hall, 610 Langdon Street, University of Wisconsin—Extension, Madison, WI 53703.



RESIDUE:
LANDFILL AND INCINERATION

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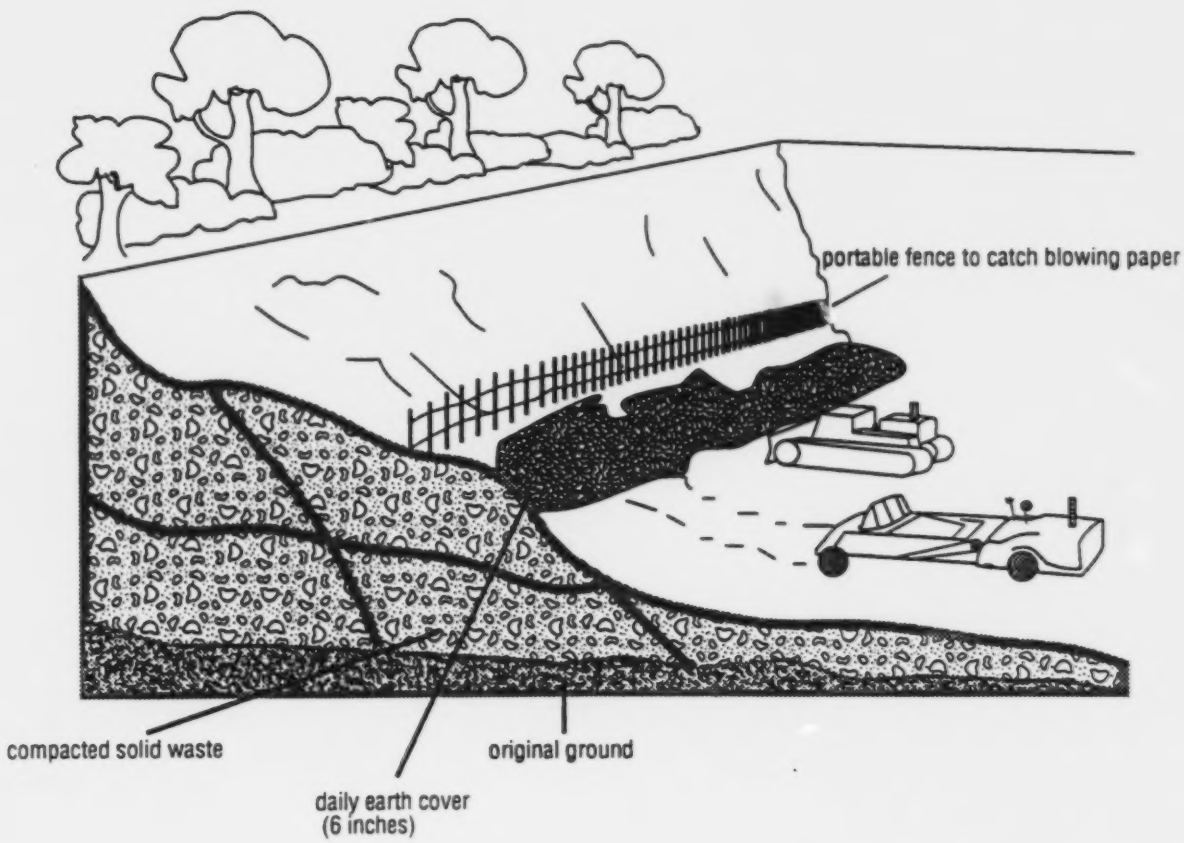


When Will It Ever End?

Objective

Students will understand that society must provide for landfill sites.

Subjects

Language arts, social studies.

Skills

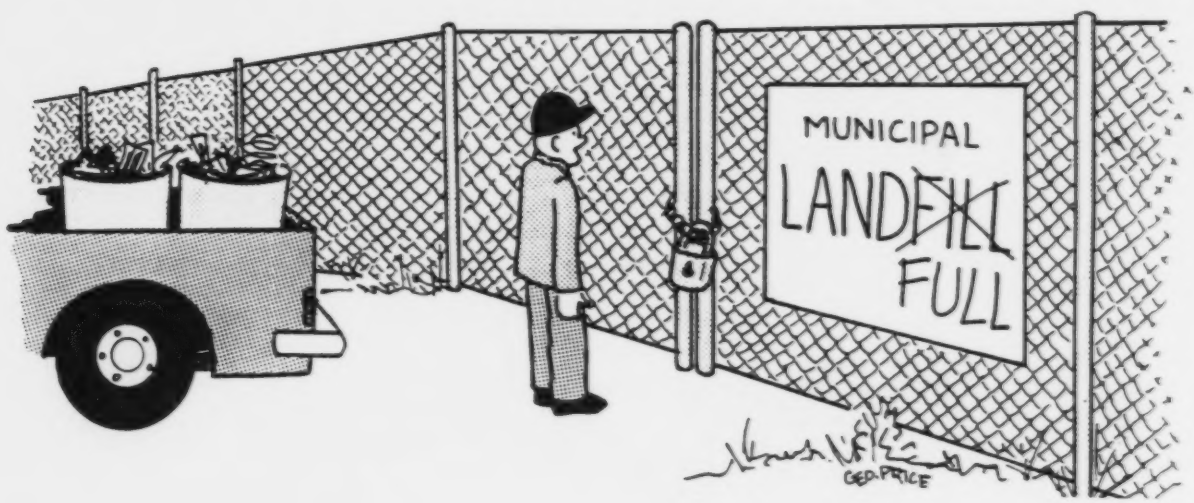
Critical thinking, reasoning, group work, hypothesizing.

Materials

Torn plastic bag, ripped paper bag, ruined piece of clothing, broken record, wornout shoe, (things no longer useful).

Procedure

1. Divide the students into groups, choosing one person as spokesperson.
2. Give each group an item which has no more useful life.
3. Ask each group to speculate for 3 minutes about the past and future of the item.
4. Ask the group's spokesperson to give a summary to the class.
5. Hypothesize about the future of a useless large item.
6. Discuss the idea that landfills will always have to be available even if reuse and recycling are practiced by everyone.



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Landfills

Concepts

Most solid waste is disposed of in landfills, but landfills are filling up.

Objective

Students will learn how a sanitary landfill is made and operates and will understand some of the associated pollution problems.

Method

Students will review how a landfill works and will visit a sanitary landfill.

Subjects

Science, social studies.

Skills

Observing, recording.

Time

One class period, field trip.

Vocabulary

leachate, sanitary landfill, refuse.

Background

As the hazards of open dumping have become better known, landfill designs and rules have changed to better protect public health and our environment.

There are several operating rules which characterize a sanitary landfill. Open burning is not allowed. Wastes are spread out, compacted, and covered frequently with several inches of soil to reduce odor; control litter, insects, and rodents; and protect public health. Liners and leachate collection systems are installed to protect ground and surface water from contamination. Fencing helps to control litter and prevent illegal dumping. When the site is finally full, it must be covered with a thick layer of soil, landscaped, and provisions must be made for the safe escape of methane gas and continued collection of leachate and monitoring of groundwater.

Leading Question

Do we take our trash to a sanitary landfill or an open dump?

Procedure

1. Explain the differences. Watch a video on how a sanitary landfill works.

2. Is there a landfill in your community? If not, where is the closest one? Is there a transfer station? Take a field trip to a local landfill. Call ahead and set up a time for your visit. Have students develop a list of questions to ask landfill personnel. (You can use the list on the following page to guide your investigation.)

Evaluation

Why are sanitary landfills now required in place of open dumps? How might we reduce our need for landfill space?

Extensions

1. Design a use for your local landfill when it closes.

2. Make a mini-landfill.

Adapted from the Association of Vermont Recyclers *Teacher's Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601.

Visit to a Landfill

Name: _____ Date: _____

Can you tell it is a landfill from the road? _____

Can you see what is happening from the road? _____

Does the site stand out from the rest of the landscape? _____

Are there many houses nearby? _____

What noises do you hear? _____

What kinds of trash do you see? _____

What is being done to the refuse? _____

How many vehicles do you see working there? _____ coming and going? _____

What kinds of vehicles? _____

What are they used for? _____

How many workers? _____

Where does the leachate go? _____

Is it collected? _____

Can you see or smell methane gas coming from the landfill? _____

Adapted from the Association of Vermont Recyclers *Teacher's Resource Guide for Solid Waste and Recycling Education* with permission. AVR, P.O. Box 1244, Montpelier, VT 05601.

Making a Mini-Landfill

Subjects

Science, social studies

Grades

3-10.

Teaching Time

Step A - 20 minutes; Step B - 20 minutes; Step C - 20 minutes.

Focus

Waste reduction, biodegradation, organic, renewable, and nonrenewable resources.

Rationale

Products that end up as waste are made from a variety of natural resources. Because of differences in composition and biodegradability, much of what we now throw away could be composted or recycled.

Learning Objective

Students will:

understand the meaning of the terms "organic," "biodegradable," "renewable," and "nonrenewable resource" and why each kind of waste should be handled in a particular way.

Materials

Four large clear glass jars

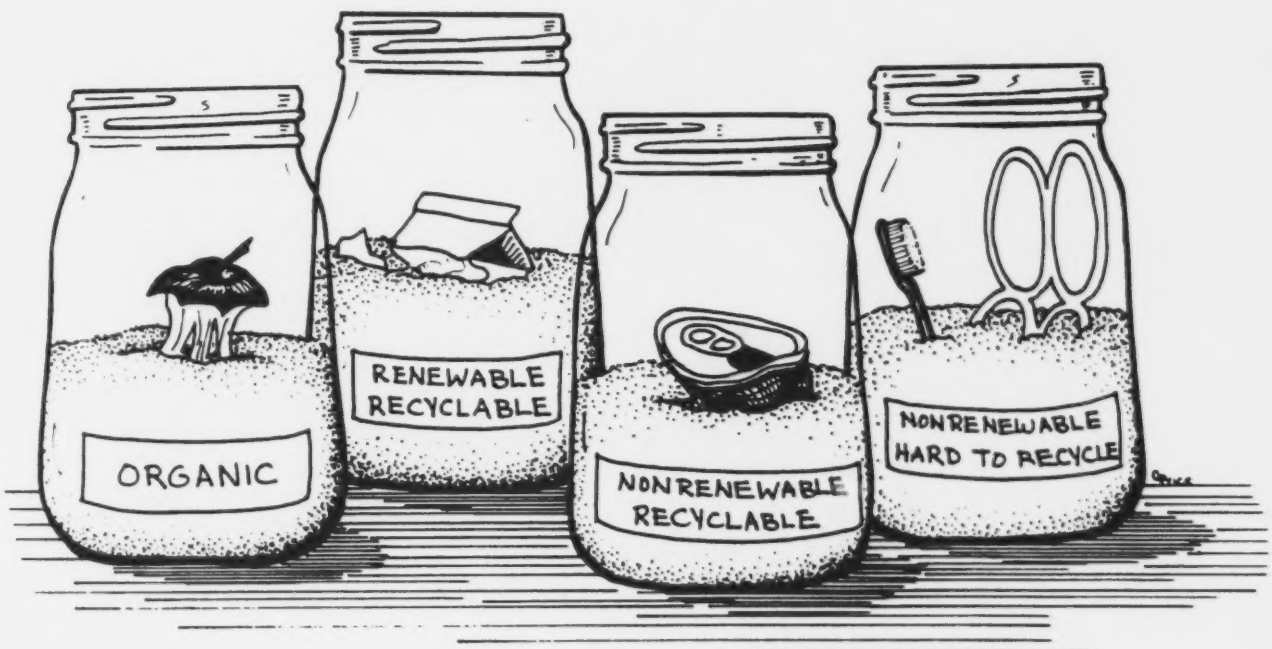
Soil

Wooden spoon

Four sample garbage pieces

Labels

Enduring litter poster



Pre- and Post-Text Questions

1. What does "biodegradable" mean?

2. What is the difference between a dump and a sanitary landfill?

3. Which natural resources are renewable? Which are not? Why?

4. What are four items you use everyday you could recycle?

Learning Procedure

Step A.

1. Ask students how garbage is disposed of. Discuss: The proper disposal method for each component of garbage should be determined by its natural resource content.

2. Show examples to students and outline four basic categories of solid waste:

   Organic (for example, potato peelings)

   Renewable resource/recyclable (for example, aluminum can)

   Nonrenewable resource/recyclable (for example, aluminum can)

   Nonrenewable resource/hard to recycle (for example, styrofoam cup)

3. Have students draw the life cycle of these items from raw material to disposal in a landfill.

4. To save natural resources and to reduce solid waste, from which of these four categories would you try to buy products? Which category of products would you avoid? Taking each of the examples listed (potato peelings, newspaper, aluminum can, styrofoam cup), think of ways to avoid disposing of them in a landfill.

Step B.

1. Ask students to fill four glass jars with the same amount of soil. Each student may wish to have a jar.

2. Label each jar with one of the four category headings:

   Organic

   Renewable/recyclable

   Nonrenewable/recyclable

   Nonrenewable/hard to recycle

3. Put an appropriate small sample in each jar. Cover with soil and dampen with water. Leave the lids off.

4. Observe and chart what happens over two to three weeks. Discuss the condition of the various kinds of waste. Discuss biodegradability. Compare the mini-landfill to real landfills. From your observations, discuss the potential environmental problems associated with waste in landfills (leachate contamination of water, smell, methane gas, garbage-truck traffic, litter, scavenging birds and animals, scarcity of landfill sites, cost, loss of natural resources and energy, etc.).

Step C.

1. At the grocery store, while purchasing the family's groceries, have each student keep a record of the purchases by dividing them into the four solid waste categories.

2. In class, have students discuss which items they should eliminate from their shopping list or how they can substitute the nonrenewable/ nonrecyclable items with items that use renewable resources and generate less trash for the landfill.

Chart for "Making a Mini-Landfill"

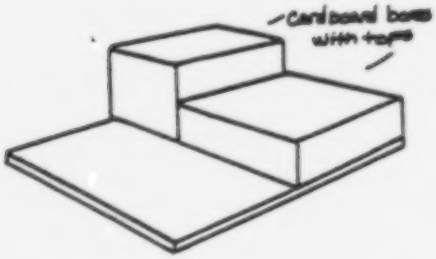
Product	Chart for "Making a Mini-Landfill" (Step B) What type of resources were used for the packaging?				Is this product necessary?	Is there an alternative?	How could this product be better packaged to save resources and energy?
	Organic	Renewable/ recyclable	Nonrenewable/ recyclable	Nonrenewable/ nonrecyclable			

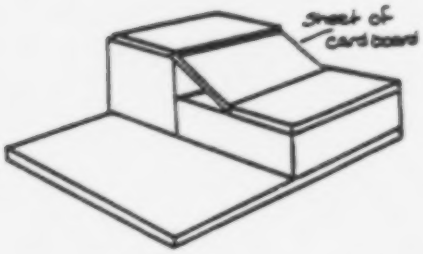
Chart for "Making a Mini-Landfill" EXAMPLE

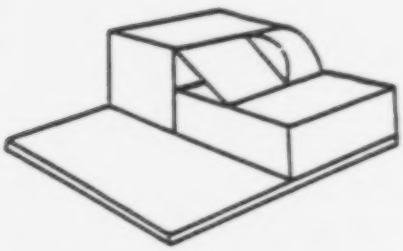
Product	Chart for "Making a Mini-Landfill" (Step B) What type of resources were used for the packaging?				Is this product necessary?	Is there an alternative?	How could this product be better packaged to save resources and energy?
	Organic	Renewable/ recyclable	Nonrenewable/ recyclable	Nonrenewable/ Nonrecyclable			
Plastic milk jug					Yes	Yes	In glass or waxed cardboard
Chewing gum		part	part	part	No	part	package in biodegradable paper
Vegetables in tin can				Where a market exists	Yes	Yes	Can vegetables in jars yourself.
Pop in aluminum can					No	Yes	Glass (also returnable glass)

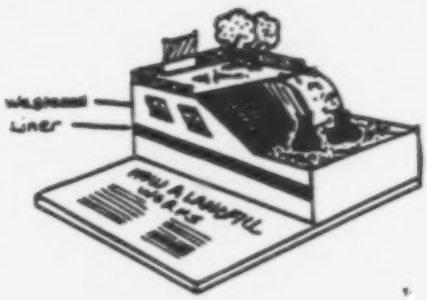
3-D Landfill Design

- To better understand elements of landfill design.
- To experience using craft materials to model an environmental project.









Big Ideas

Sanitary landfills are part of the modern landscape.

Professional engineers and landscape architects build similar models when they design a project like a landfill.

Needed:

cardboard boxes

plywood

glue or masking tape

papier-mâché

paint

scissors or knife to cut cardboard

Teacher:

1. Ask each student to bring two cardboard boxes (shoebox size) from home. The boxes should be of approximately equal size.

2. Collect the other materials necessary to build a model landfill.

3. Have the cardboard bases cut before the meeting. You need one base per member.

4. Involve students in discussing what they know about landfills and how landfills look.

5. Have youth leader explain the steps to building the model landfill.

Students:

1. Discuss the elements of a landfill: how they are built and why.

2. Follow the steps to building a model landfill.

How

1. Paint a cardboard base. Take two equal-size cardboard boxes with tops and cut one to about one-half its height. Glue or tape them side by side on the cardboard as shown.

2. Take a piece of cardboard as wide as the boxes and about 4 inches longer than the length of the two boxes. Fasten the top of one box to the top of the other box to make a sloped area as shown.

3. Use small pieces of cardboard and papier-mâché to build up slope, showing where wastes would be buried.

4. Use papier-mâché and paint to give the appearance of ground and to show buried waste cell, landfill liner, leachate and gas control systems, etc. Use your imagination. Add shrubbery, trees, fences, signs, toy garbage trucks, and plastic bags, as appropriate.

5. Write a description of a landfill and fasten it to the plywood board with glue or tape.

Going Further

1. Use the landfill model for a fair project or a window display.

2. Use the landfill model as the subject of an illustrated talk or demonstration.

Hints

1. This is one way to build a model landfill. Teachers or students may be able to think of other methods.

2. Instead of working individually, students can collaborate in groups of two or three.

3. Building a landfill model will give students experience in working with crafts as well as a better understanding of a landfill's major components.

4. As part of their job, professionals such as engineers, architects, landscape architects, and planners often build similar models to help visualize projects they are working on.

Adapted with permission from: *Recycle for Reuse* 4-H, Cooperative Extension Service, 328 Lowell Hall, 610 Langdon Street, University of Wisconsin—Extension, Madison, WI 53703.

The Incredible Edible Landfill

Topic

Garbage and solid waste disposal.

Ages

Grades 3-12.

Duration

1-2 hours.

Setting

Indoors.

Source

Community Recycling Center, Champaign, Illinois.

Intergovernmental Solid Waste Disposal Commission, Urbana, Illinois.

Schatz, Albert and Vivian. 1971. Teaching Science with Garbage. Emmaus, PA: Rodale Press, Inc.

Objectives

1. Students will become aware of how much garbage they produce.

2. Students will be able to visualize a ton of garbage.

3. Students will be able to identify the parts of a landfill.

Method

Students discuss the word garbage and the problems it causes people and their environment. After identifying the parts of a safe landfill, students build their own landfill out of edible materials.

Background

In 1970, there were 1,200 landfills and 12 incinerators accepting garbage across the state of Illinois. By 1990, the numbers had shrunk to 117 landfills and one municipal solid waste incinerator. Recycling efforts in no way match the pressures being placed on remaining solid waste facilities, and municipalities are facing a serious crisis. What should be done with all of the garbage? Creating a new landfill site is a lengthy and frequently controversial process, one that has resulted in the opening of very few new solid waste facilities. Environmental, citizen, and governmental concerns must all be addressed and satisfied before a landfill can begin accepting garbage for disposal.

Materials

Paper bag filled with 5 pounds of garbage

1-gallon water jug

Scale

Worksheets

Chocolate pie crust = clay liner

Red licorice whips = liquid collection tubes

Graham cracker crust = sand and gravel layer

Chocolate pudding = dirt

Vanilla pudding = "garbage"

Peanuts, raisins, chocolate chips

Coconut dyed with green food coloring = grass

Procedure

1. Open the activity by discussing what is included in our garbage. Invite the students to generate a list of garbage types:

a. household (family waste): food, paper, glass, plastic, etc.

b. yard waste: trees, leaves, brush, etc.

c. construction waste: lumber, plaster, electrical materials, plumbing equipment, etc.

d. industrial waste: paper products, fertilizer, food processing, etc.

2. Discuss why garbage disposal has become such a problem:

a. more people

b. throw-away society

c. more packaging

3. To make garbage more personal, have the students trace their breakfast back to the raw materials. How much waste was generated to put the food on the table, and how much food was wasted at the table? Each person generates approximately 5 pounds of trash each day, and approximately 1 ton of garbage a year.

To help the students visualize how much garbage the average person produces each day, show them a paper bag filled with 5 pounds of garbage. Using a gallon milk jug, have the students calculate how many gallons of water equal one ton (250 gallons of water).

4. To help the students begin to comprehend how much garbage a ton is, have them measure out the following:

How big is a ton?
3-1/3 cubic yards = 1 ton garbage

To visualize how much room it would take to accommodate one ton of garbage, have the students map out 3-1/3 cubic yards, using a yardstick and string. Involve the students by having four students stand in a 3.3 x 3.3-yard square and hold pieces of string 3.3 yards from the floor to form a cube.

Building the Landfill

Step 1

1. Pour vanilla pudding in one bowl, chocolate pudding in another bowl. Have two people from your group bring the pudding bowls over to the milk table and pour two cups of milk into each bowl. Mix with wire wisk. Have three people from your group come to the front table and pick up raisins, peanuts, and chocolate chips, and mix these in with the vanilla pudding. Let both puddings stand undisturbed for 10 minutes.

2. Unwrap the pie crust and have one person from your group get the licorice from the front table.

3. Divide the graham cracker crumbs into one big and one small pile.

Step 2

Divide the class into groups of four to five people. Each group may construct its own landfill by following these directions:

1. Place the licorice across pie crust.

2. Press the big pile of graham cracker crumbs around and over the licorice and up the sides of the pie crust.

3. Spread a thin layer of vanilla pudding in bottom of pie.

4. Spread a thin layer of chocolate pudding over vanilla pudding.

5. Repeat layer of vanilla and chocolate, ending with a chocolate layer.

6. Sprinkle green coconut over top of chocolate.

7. Eat!

Adapted with permission from: Community Recycling Center, 720 N. Market, Champaign, IL 61820.

Trash to Ash

Objective

Students will observe how incineration reduces waste and produces emissions.

Subjects

Science, math.

Skills

Calculating, observing, measuring.

Materials

metal can (3-pound coffee can or 1-gallon can) with several holes for vents approximately 3/4 to 1 inch from bottom

fine metal screening for can top

5-inch-square pieces of cardboard (5)

masking tape

assistant paper

egg shells, orange rind, napkins, food scraps, (enough to fill each 5 x 5 x 5 container)

matches

ruler

worksheet and background information on resource recovery

Procedure

1. Discuss with students what incineration means.

2. Discuss with students what they think happens to items when they "burn."

3. Describe the activity they will complete:

–The trash they have will be burned to see the effects of incineration.

4. Have students tape the cardboard sections together to form a box 5" x 5" x 5" and proceed to put assorted forms of trash into it.

–Calculate the volume of waste

(5" x 5" x 5" = 125 sq. in. volume of waste.)

5. Place the trash from the box into the can and light the trash on fire. Cover immediately with screening.

6. Observe what is emitted from the can while burning, and record on worksheet.

7. When the ashes have cooled, place them back in the box and calculate the volume of ash remaining, using the same formulas.

8. Calculate the difference in volume of trash before and after the burning process.

9. Discuss the following with the students:

   a. What would the benefits of incineration be? (air pollution,smoke, etc.)

   b. What problems are associated with incineration? (sickness, odors, etc.)

   c. How could these problems affect you?

Adapted with permission from: *Here Today, Here Tomorrow*, New Jersey Department of Environmental Protection, Division of Solid Waste Management, CN 414, Trenton, NJ 08625-8591.

Trash to Ash Worksheet

Calculate the volume of waste.

Volume = length × width × height

length _____

width _____

height _____

Multiply _____ x _____ x _____

Volume of waste = _____

Calculate the volume of ash.

length _____

width _____

height _____

Multiply _____ x _____ x _____

Volume of ash = _____

Reduction of waste through incineration:

Volume of waste _____

minus volume of ash _____

Equals _____

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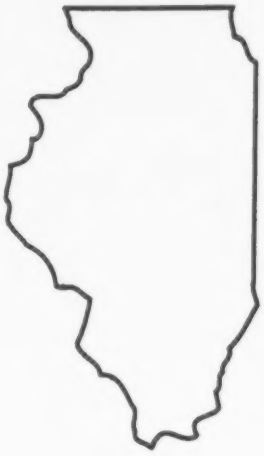

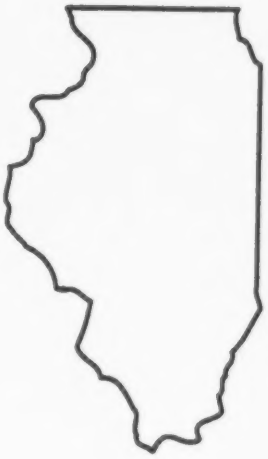

Recycle Illinois!

Recycle Illinois!

RESOURCES FOR TEACHERS

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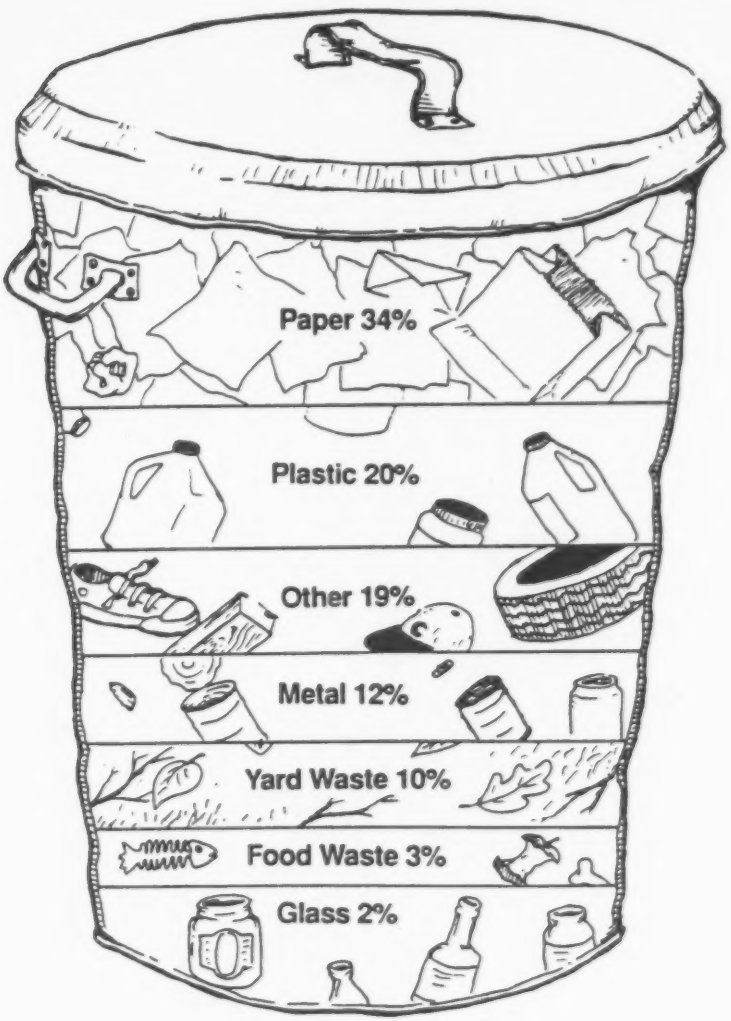


Contents of an average garbage can by volume

Glossary

aerobic
chemical or biological process occurring in the presence of oxygen.

anaerobic
taking place in the absence of oxygen.

ash
a by-product of burned waste.

bacteria
single-celled, microscopic organisms with rigid cell walls; can be aerobic or anaerobic; can cause disease; can be important in the stabilization and conversion of solid wastes.

biodegradable
a term describing a substance or material that can be broken down into simple compounds by microorganisms.

compost
a soil-like substance containing humus from decomposed organic materials, such as leaves and food scraps, that may be used as a soil conditioner.

composting
accelerated breakdown of grass clippings, leaves, paper, and other organic solid waste in the presence of oxygen by aerobic (oxygen-needing) bacteria and fungi to produce compost.

conservation
the use and protection of such natural resources as forests, water, and air; methods include reducing unnecessary waste, recycling, reuse, improved efficiency, and decreased resource use.

consume
to use up something.

consumer habit
person who buys goods or services over and over again without thinking why they are choosing a certain product.

contaminate
to make impure or unfit.

cycle
circle; return; occur again.

decompose
to break down into basic compounds; rot.

disposal
getting rid of solid waste.

dump
an unpermitted, illegal land site where solid waste is disposed of in an open manner and left exposed to decompose.

environment
the physical, chemical, and biological factors that surround and affect an organism.

fossil fuels
oil, coal, and natural gas — three nonrenewable natural resources.

groundwater
water below the ground's surface.

humus
the organic portion of soil made from decaying plant and animal material.

incinerator
a facility used to burn garbage.

landfill
a system of garbage disposal where the waste is buried.

leachate
a liquid formed when water seeps through a material such as decomposing garbage, compost, or ash.

methane
a colorless, odorless, flammable gas formed by plant decomposition.

mineral
element or compound occurring in the earth's crust; mineral resources are classified as metallic (such as iron and tin) or nonmetallic (such as fossil fuels, sand, and salt).

municipal solid waste
nonhazardous waste from households and commercial and industrial sites.

natural resource
naturally occurring materials such as plants, animals, soil minerals, water, and air.

nonrenewable resource
a raw material that cannot be replaced by nature in a relatively short period of time.

packaging
a commodity's wrapping or sealing, generally designed to meet consumer needs for environmental protection, safety, economics, aesthetics, and convenience.

recycle
to collect, process, and market materials so that they can be used again.

recyclable
made of materials which are collected for recycling within your community.

reuse
to use an item again.

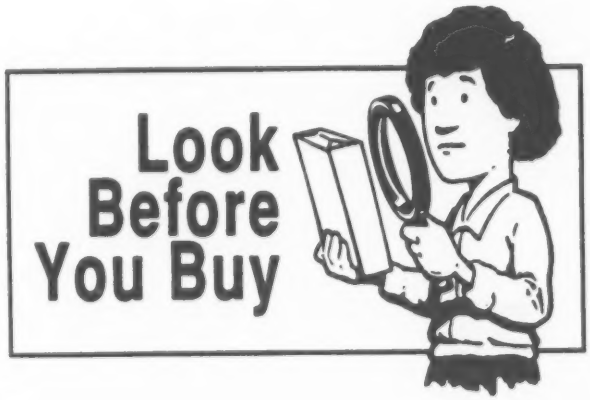
sanitary landfill
a specially engineered site for disposing of solid waste on land, constructed so that it will reduce hazard to public health and safety.

solid waste
all solid and semisolid wastes including garbage, rubbish, ashes, industrial wastes, and household discards such as appliances, furniture, and equipment.

solid waste management
the handling, processing, and disposal of all solid waste.

source reduction
to lessen the amount of waste generated.

surface water
rainfall that does not infiltrate into the ground, but becomes runoff that flows into nearby streams, rivers, lakes, wetlands, and reservoirs.



Project Solid Waste

Activity	Subject Area-State Goal Number					
Title	Page #	Language arts	Math	Bio-phys. sciences	Social sci.	Fine arts
Introductory Activities						
Garbage-Bag Recipe	3	2,4	2	1,2	4	2,3
Out of Sight, Out of Mind	6	1,2,4	1,6,7		2	4
Solid Waste Bulletin Board	9	1,2,4		1,2,4	1,4	3
What Kind of Waste Am I?	11	1,2,4		1,2	4	2,3
Reduce						
Not in My Shopping Cart	21	1,2		4	4	
Why Buy Me?	23	1,2,4		1,4		
Paying the True Price of Pop	25	1,2,4	1,6,7	2	1,4	
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Make Your Own Paper	52	1,2	3,7	2	4	1,2,3
How to Set Up a Home Recycling Center	54	1			4	
Making Waves	57	3,4			4	1,2,3,5
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When Will It Ever End?	61	2,4		1,2,4	1,2,4	
Landfills	62	2		1,2,4		
Making a Mini-Landfill	64	1,2,4	3,6,7	1,2,3,4	2,4	3
3-D Landfill Design	68	1,2,4	3,7	2,4		2,3
Incredible Edible Landfill	70	1,2,4	2,7	1,2,4	1,2,4	2,3
Trash to Ash	72	2,4	1,3,6,7	1,2,4	1,4	

State Learning Goals

Language Arts State Goals for Learning

As a result of their schooling, students will be able to:

1. read, comprehend, interpret, and use written material.

2. listen critically and analytically.

3. write standard English in a grammatical, well-organized, and coherent manner for a variety of purposes.

4. use spoken language effectively in formal and informal situations to communicate ideas and information and to ask and answer questions.

5. understand the various forms of literature representative of different cultures, eras, and ideas.

6. understand how and why language functions and evolves.

Mathematics State Goals for Learning

As a result of their schooling, students will be able to:

1. perform the computations of addition, subtraction, multiplication, and division using whole numbers, integers, fractions, and decimals.

2. understand and use ratios and percentages.

3. make and use measurements, including those of area and volume.

4. identify, analyze, and solve problems using algebraic equations, inequalities, functions, and their graphs.

5. understand and apply geometric concepts and relations in a variety of forms.

6. understand and use methods of data collection and analysis, including tables, charts, and comparisons.

7. Use mathematical skills to estimate, approximate, and predict outcomes, and to judge reasonableness of results.

Biological and Physical Sciences State Goals for Learning

As a result of their schooling, students will have a working knowledge of:

1. the concepts and basic vocabulary of biological, physical, and environmental sciences and their application to life and work in contemporary technological society.

2. the social and environmental implications and limitations of technological development.

3. the principles of scientific research and their application in simple research projects.

4. the processes, techniques, methods, equipment, and available technology of science.

Social Sciences State Goals for Learning

As a result of their schooling, students will be able to:

1. understand and analyze comparative political and economic systems with an emphasis on the political and economic systems of the United States.

2. understand and analyze events, trends, personalities, and movements shaping the history of the world, the United States, and Illinois.

3. demonstrate a knowledge of work geography with emphasis on that of the United States.

4. apply the skills and knowledge gained in the social sciences to decision making in life situations.

Fine Arts State Goals for Learning

As a result of their schooling, students will be able to:

1. understand the principal sensory, formal, technical, and expressive qualities of each of the arts.

2. identify processes and tools required to produce visual art, music, drama, and dance.

3. demonstrate the basic skills necessary to participate in the creation and/or performance of one of the arts.

4. Identify significant works in the arts from major historical periods and how they reflect societies and cultures and civilizations, past and present.

5. describe the unique characteristics of each of the arts.

Teacher Resources

For More Information, Contact:

Illinois Department of Energy and Natural Resources
Information Clearinghouse
325 W. Adams St., Room 300
Springfield, IL 62704-1892
800-252-8955 (in Illinois)
217-785-0310

These materials listed in *Solid Waste Publications Available from the ENR Information Clearinghouse* are free of charge.

Available Disposal Capacity for Solid Waste in Illinois - Summarizes solid waste disposal data collected by the Illinois Environmental Protection Agency from owners and operators of sanitary landfills.

Directory of Illinois Recycling Centers (Chicago and Downstate) - A listing of recycling centers throughout Illinois which describes businesses that purchase various types of recyclable materials.

Illinois Recycled Materials Market Directory - Serves as a guide for recyclers desiring a comprehensive list of companies that purchase large volumes of residential and commercial postconsumer recyclables in addition to providing data on end manufacturers, major material processors, and brokers.

Recycle: Be Part of the Solution, Not Part of the Problem - A pamphlet on home recycling.

Sources of Recycled Paper (ENR/89, 10pp).

Office Paper Recycling Guide (ILENR/RR-91-09) - A guide to a complete office paper recycling program.

Yard Wastes: A Homeowner's Guide to Recycling - A pamphlet on home composting (ILENR/RR/89/03).

Clip Art: A Collection of Waste Reduction and Recycling Graphics (ILENR/RR-91/01).

Educational Materials and Activities

These materials are available free of charge from the ENR Information Clearinghouse.

Actions Speak! Developed for the middle-school level. Employs news articles and role-playing to clarify issues related to solid waste problems (6-8).

All Trashed Out - These "hands-on" activities integrate reducing, reusing, and recycling solid waste into areas of math, science and social studies (K-3).

The Land We Depend On (IEPA/89, 112pp) - An activity booklet for elementary students (5).

McHenry County Schools Recycling Education Lesson Plans - Units on recycling solid waste (K-8).

Plastics in Perspective - Designed for high school chemistry students to identify plastics in the lab and explore degradable plastics (9-12).

Recycle Our Available Resources (R.O.A.R.) - Targeted for the elementary level. Uses puppets and songs to teach students about recycling. Instructions for making puppets are provided (4-8).

Solid Waste: From Problems to Solutions, A Teacher's Handbook - This 16-page handbook provides background information and classroom activities on solid waste mangement.

Thermodynamics and the Environment - This slide show presentation and guide are designed for physics, chemistry, or biology classes. The basic concepts of thermodynamics as they relate to solid waste issues are introduced (9-12).

Three R's - Latest version of solid waste newsletter for elementary teachers (3-5).

Waste Reduction Guide for Illinois Schools (ENR/90) - A 10-step guide to starting a recycling program in your school (K-12).

Videos

These videos are available on a free loan basis from the ENR Clearinghouse.

"Illinois Composting: A Look at Four Sites" (ENR/90, Length: 15:18) - Visits four Illinois commercial and municipal composting operations. Looks at the equipment used and materials collected at each site. (For community groups, haulers, and government officials.)

"Reduce, Reuse, Recycle: It's Elementary" (Length: 20:00) - A video for elementary/middle level students illustrating the solid waste problem and solutions students can practice in the school (K-6).

"Residential Yard Waste: Homeowner's Guide to a Better Lawn" (ENR/90, Length: 12:00) - Instructs homeowners in how to generate less landscape waste for collection and disposal. Also provides mowing tips and depicts examples of backyard compost methods for leaves and grass clippings (9-12).

"Recycle This" - This amusing 45-minute video produced by Dow demonstrates how recycling saves energy, reduces waste, and conserves resources. The video targets high school audiences and imitates well-known actors and the "Jeopardy" game show (6-12). Contact ENR to borrow a video or Dow at (800) 441-4369 for your own copy.

"The Rotten Truth" (Children's Television Network video for elementary students) (Length: 30:00) - A video designed for elementary/middle-level students on the solid waste problem and solutions (K-6).

"The Wonderful World of Recycle" (Length: 13:00) - A video for primary grades on what can be recycled and how new products can be made from recycled materials (K-3).

"Yakety Yak—Take It Back" - This 45-minute music video promotes the 3R's message through short skits using animation and famous musicians such as Bette Midler and B. B. King. By previewing, teachers can select the skits appropriate for their classrooms (K-6). Contact ENR for a loan video or (800) 9-YAKETY for your own $11.95 copy.

Video Guide:

A Teacher's Guide to Selected Videotapes on Solid Waste Management includes an overview, summary, discussion questions, and activities on 12 videos for grades K-12.

For Additional Videos

University of Illinois Film/Video Center
1325 South Oak Street
Champaign, IL 61820
800/367-3456

A number of videos are available for free loan:
Catalog of Solid Waste Video Resources, 1990-91 - Approximately 45 videos on solid waste topics for grades K-12.

Supplemental Educational Materials

Association of Vermont Recyclers
Teacher's Guide for Solid Waste and Recycling Education
Activities K-12, AVR
P.O. Box 1244
Montpelier, VT 05602
$45.00

Recycling Study Guide
Recycling Teaching Guide Grades 4-8
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707
608/266-2711
(free)

A-Way with Waste (third Edition, 1990) (K - 12)
Contact: Jan Lingenfelter
A-Way with Waste
Washington State University
Department of Ecology
4350 - 150th Avenue, N.E.
Redmond, WA 98052
(206/867-7043)
$28.50

Books located at your library or bookstore:

Coltharpe, B. 1990. *Mr. Rumples Recycles*. Baton Rouge, LA: Hyacinth House.

Dr. Seuss. 1971. *The Lorax*. New York: Random House.

Earth Works Group. 1990. *50 Simple Things Kids Can Do to Save the Earth*. Kansas City, MO: Andrews and McMeel.

Madden, D. 1986. *The Wartville Wizard*. New York: Macmillan Publishing Co.

Van Allsburg, C. 1990. *Just a Dream*. Boston: Houghton Mifflin Co. (ISBN: 0-395-53308-2).

Wilcox, C. 1989. *Trash*. Minneapolis: Carolrhoda Books, Inc.

Field Trips

Learning can be enhanced and reinforced through field trips. Consider a field trip to your local landfill site or recycling center. Visit one of the 11 paper mills or one of the seven glass plants in Illinois. Contact your local solid waste coordinator or planning board commission on who to contact to take a field trip to these places. Contact museums in your community to inquire about recycling and solid waste exhibits and activities they may have.

Do the Right Thing Illinois!

REDUCE
REUSE
RECYCLE

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Five Ways You Can Make a Difference...

1 Choose recycled and "recyclable" packaging and products. Look for this symbol:

2 Select products with minimal packaging. Buy in bulk and concentrates when you can.

3 Choose reusable products over disposable ones. Buy the most durable items available.

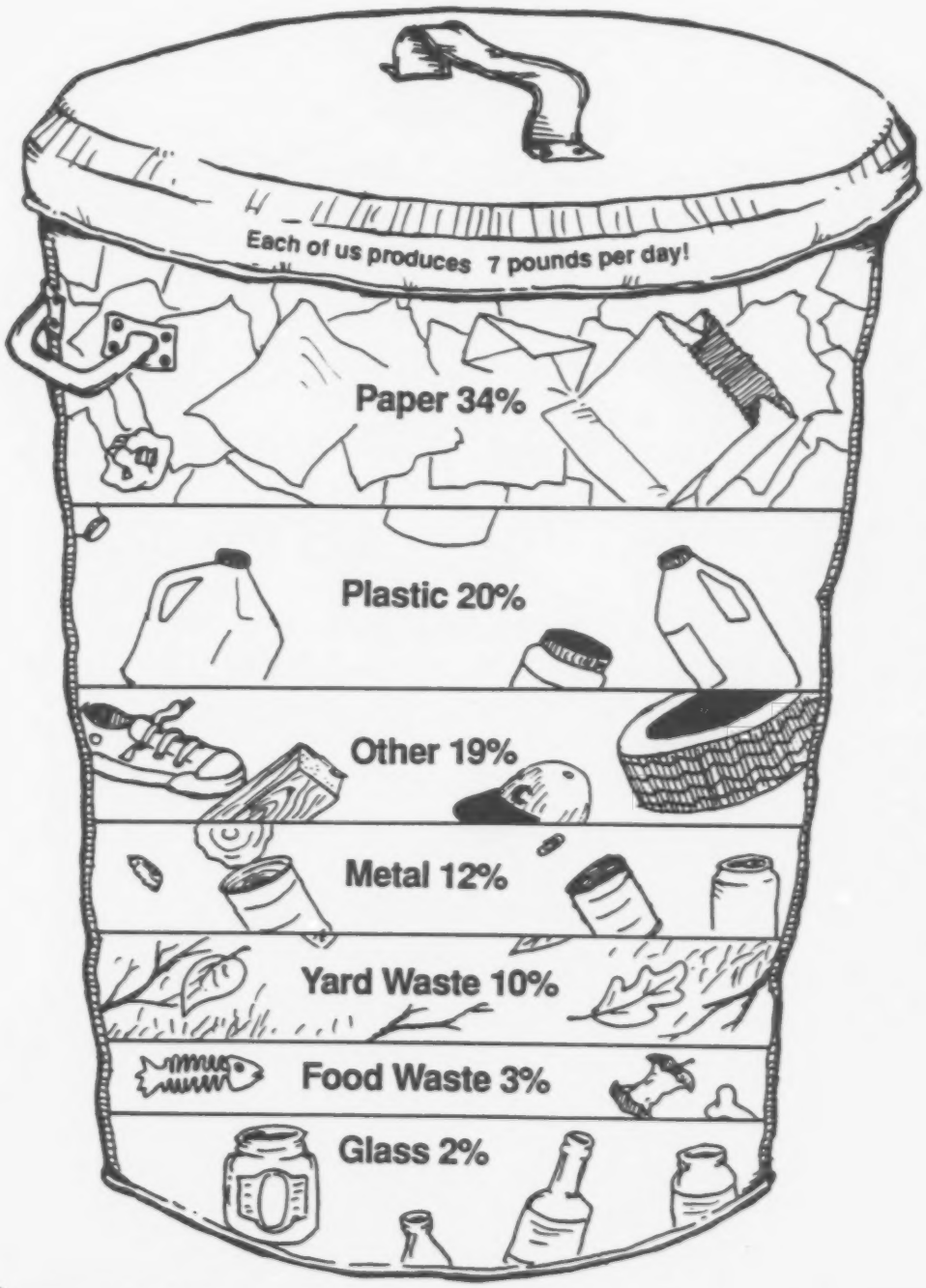
4 Find new uses for throwaway items. Donate clothing and household goods to people who can use them.

5 Recycle at home and work. Leave grass clippings on your lawn. Compost other yard waste.

For more information about what you can do to reduce waste, call the ENR Information Clearinghouse: **(800) 252-8955** (in Illinois).

Trash Can Display

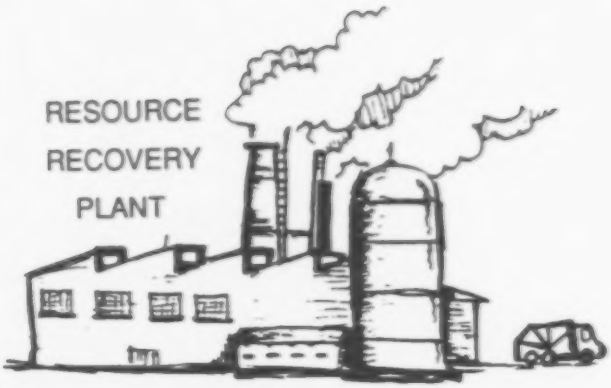
How can we save our resources from being landfilled?



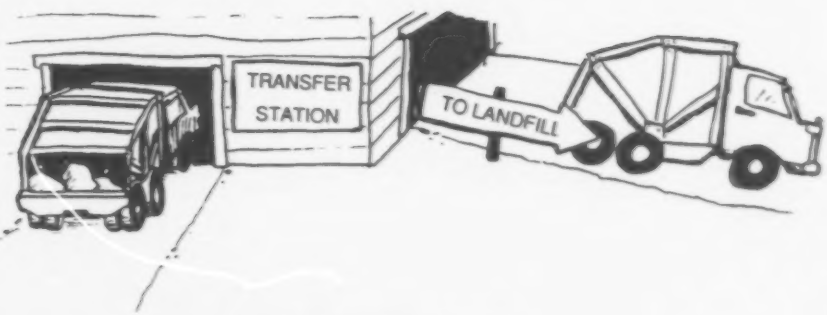
Figures are national averages by volume.
Percentage figures source: Franklin Assoc., 1990
Garbage per day source: IEPA 1990 landfill capacity report

Where Does the Garbage Go?

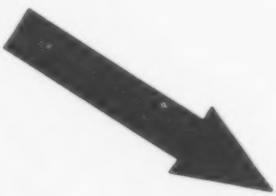
An average family of four produces about 100 pounds of garbage a week.

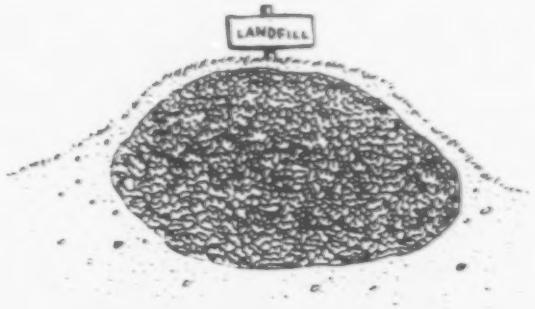


In some areas, garbage is taken to an energy recovery plant where it is burned to recover energy. Then the ash residue is landfilled.



In some areas, garbage is taken to transfer stations where it is placed in other trucks to be taken to the landfill.

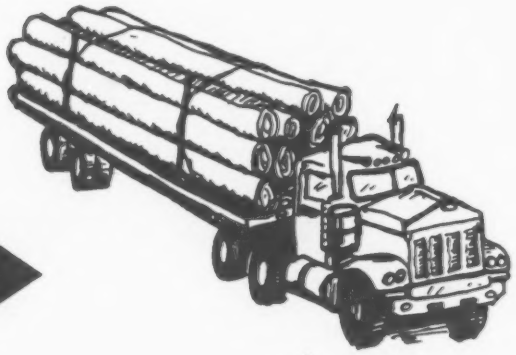




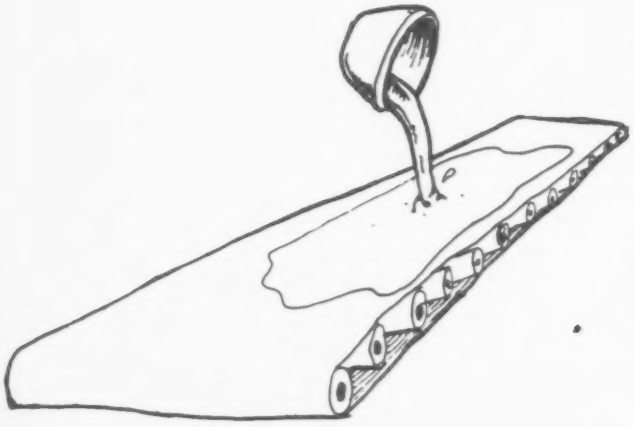
Each day's garbage is compacted and covered with a layer of dirt.

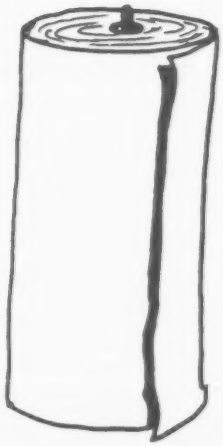
Paper Production

It takes 17 trees to make 1 ton of paper.



Sometimes newsprint and wood wastes are combined, mixed to a pulp, and poured onto large rollers. Other times, mostly used paper is processed again.

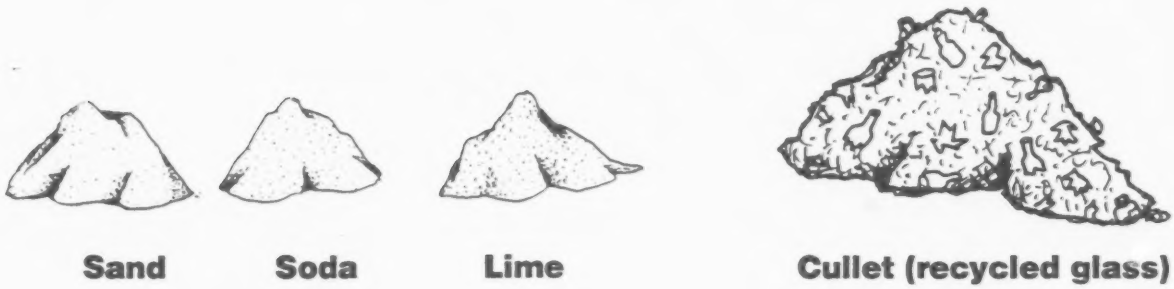




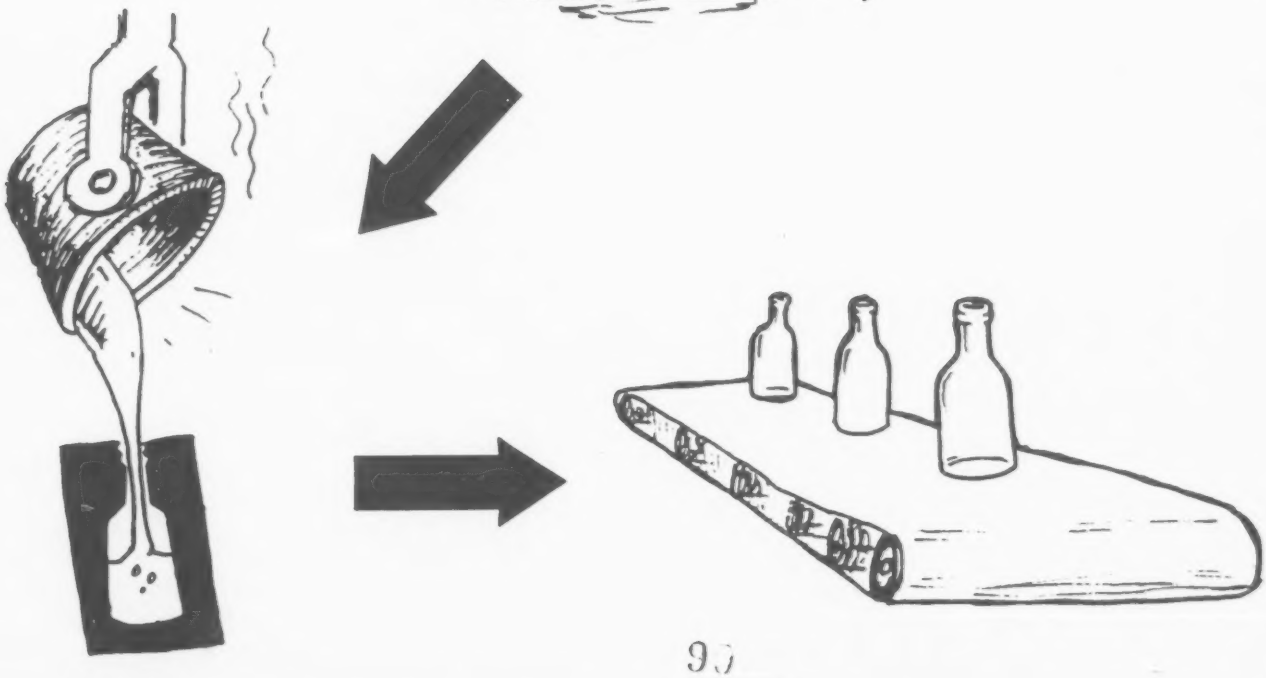
A roll of paper.

Glass Manufacturing

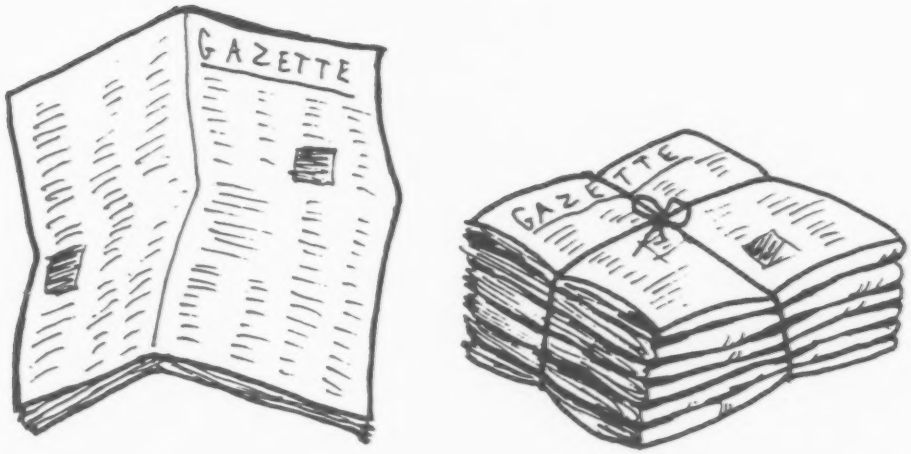
Cullet and raw materials are melted together. The melted mixture is poured into molds and injected with air. The mold is removed and the glass is cooled and shipped.



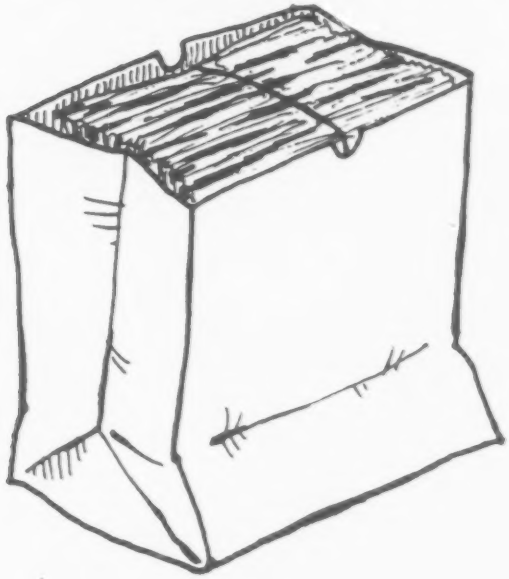
Sand **Soda** **Lime** **Cullet (recycled glass)**



Newspaper



Bundle and tie papers, or . . .

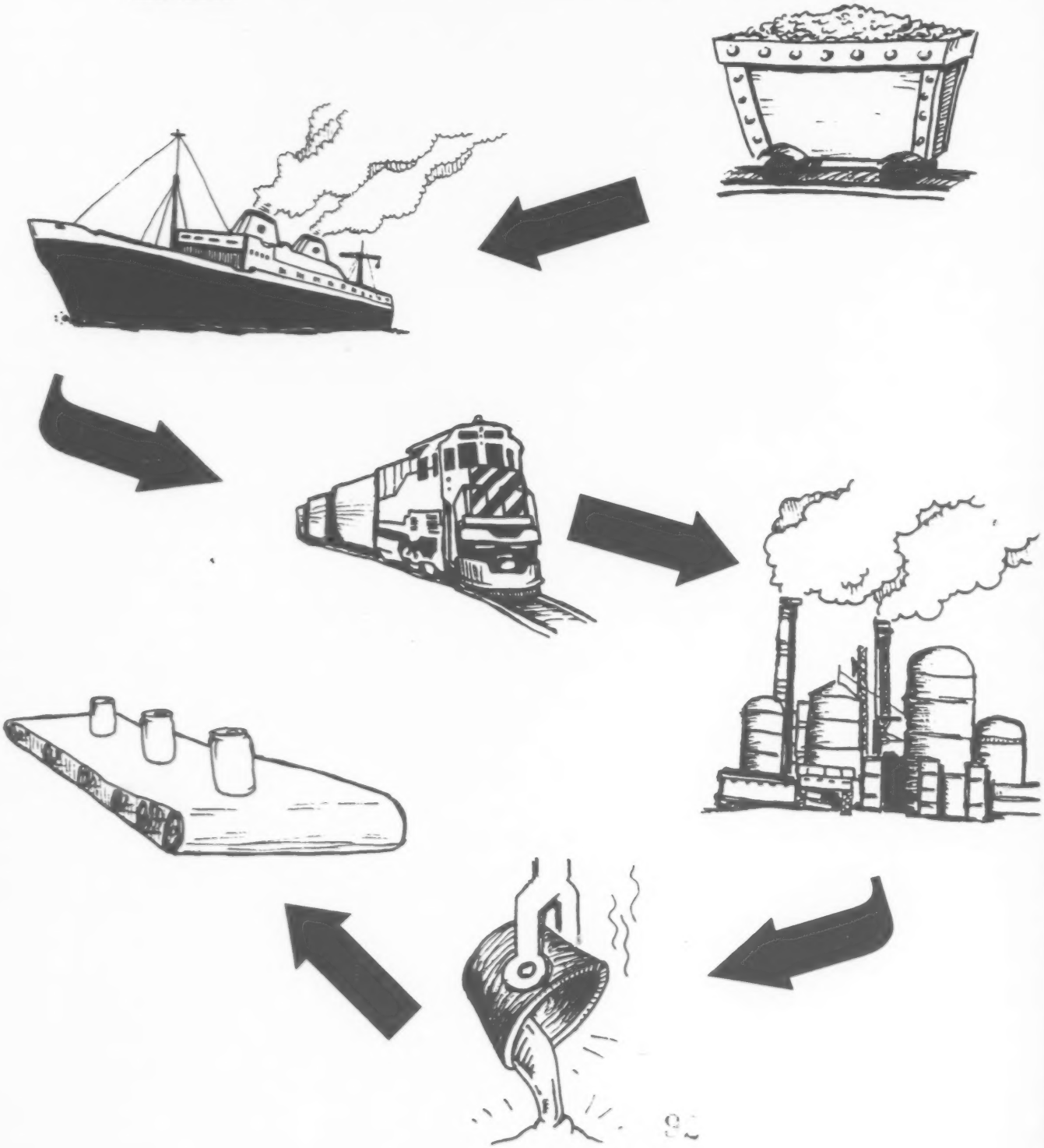


. . . put in a large brown grocery sack.
Don't use plastic twine or plastic bags.

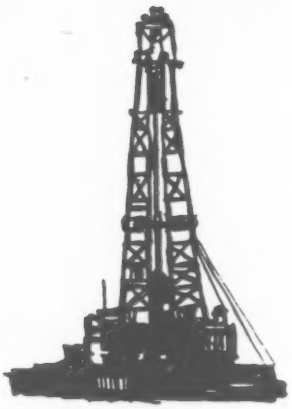
Recycling is as easy as taking out the garbage!

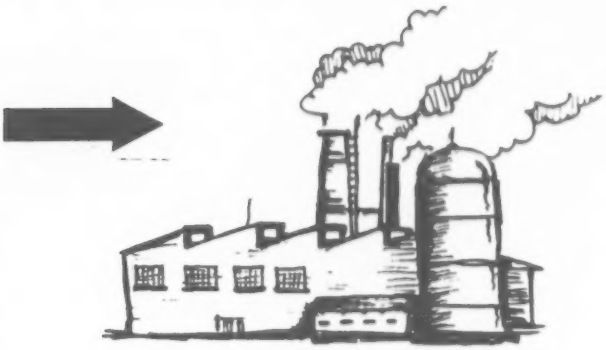
Aluminum Can Manufacturing

Bauxite is mined, shipped to the U.S., and transported to factories where electrolysis separates aluminum from bauxite. Aluminum is poured into flat sheets and later shaped into cans.



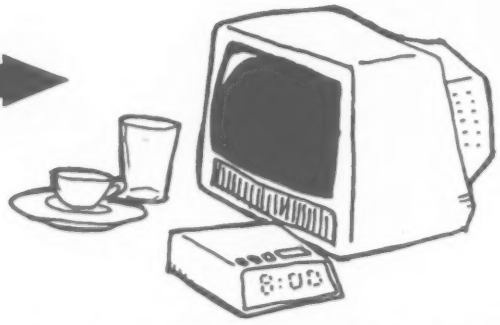
Plastic Manufacturing



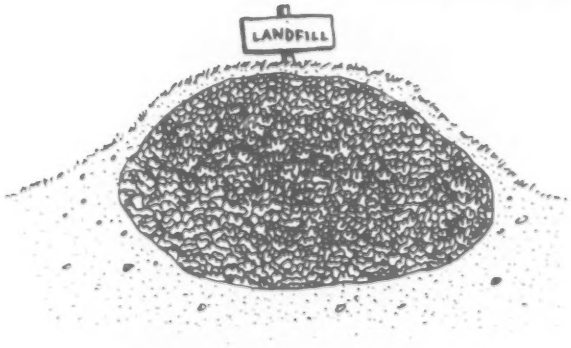


Fossil fuels (oil) and natural gas are refined and changed with heat and chemicals to make resins.

Resins make thermoplastics, and . . .



Thermoset plastics (permanently shaped)

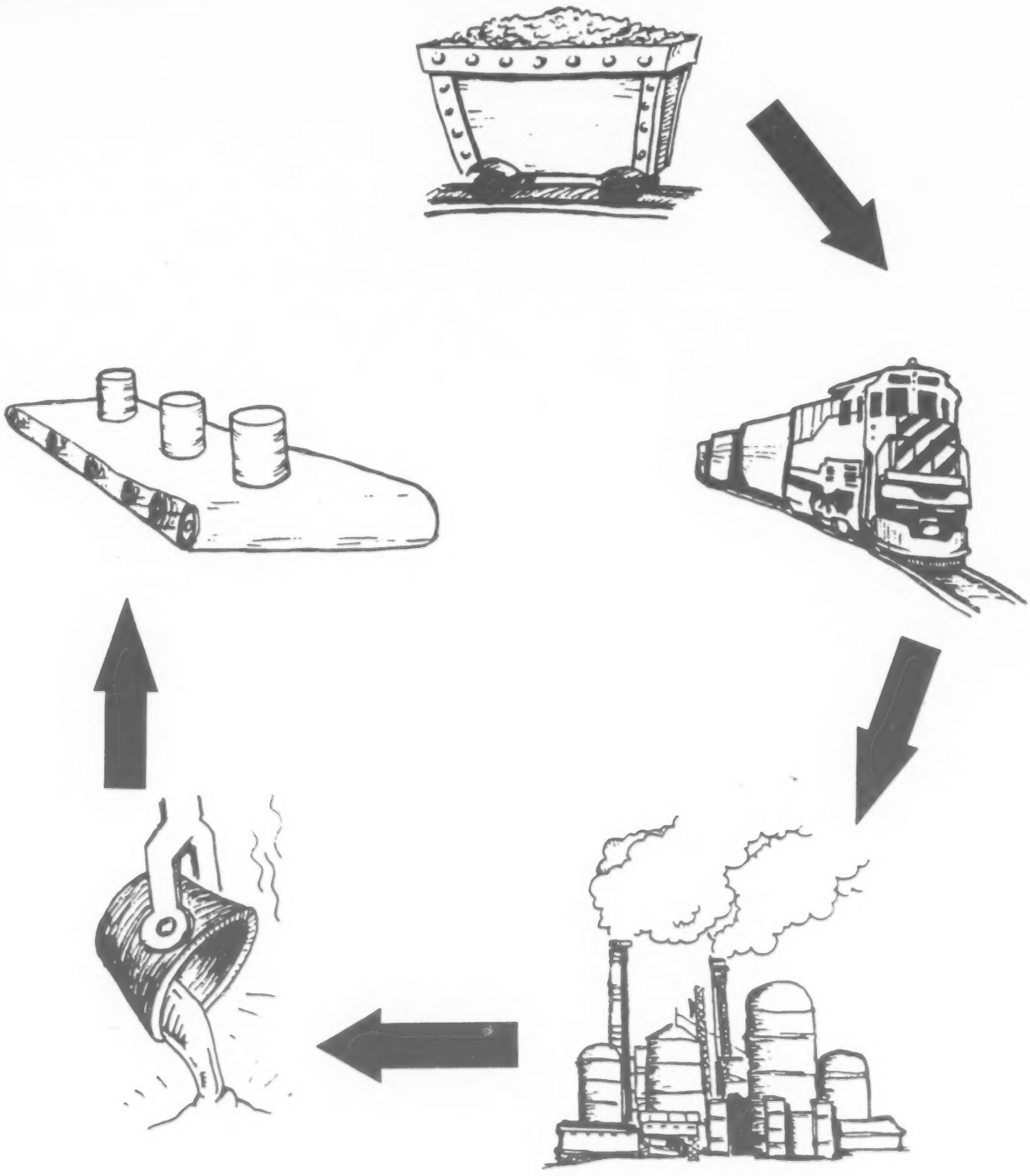


98 to 99 percent of all plastics are thrown away.

Some plastics are burned to recover their energy.

Tin Can Manufacturing

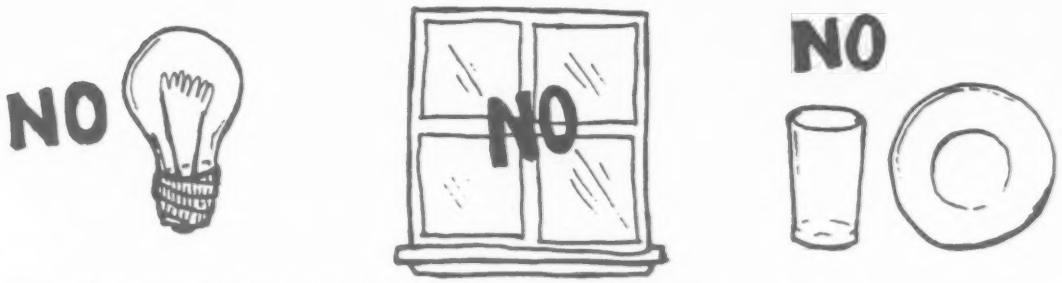
Iron ore and other minerals are dug from mines and transported to steel mills. The minerals are heated in large vats and poured onto sheets. The steel is coated with tin and shaped into cans.



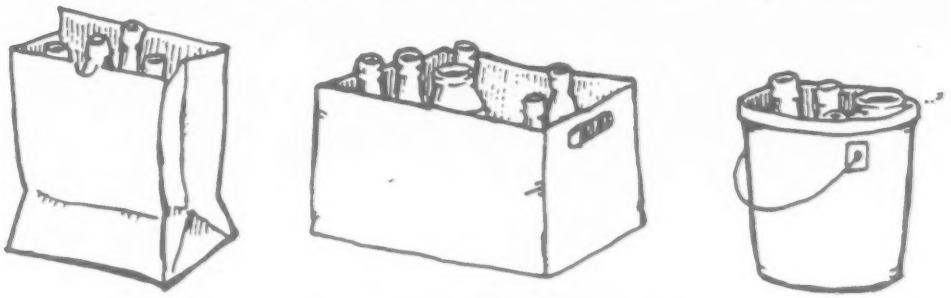
Glass Bottles and Jars

Rinse. No need to remove labels.

Separate colors into green, brown, and clear.



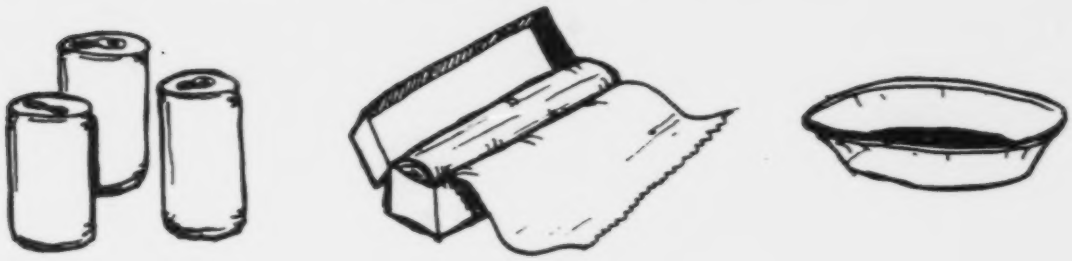
Don't recycle light bulbs, windows, dishes or glasses.



Put in bags, boxes or buckets.

Recycling is as easy as taking out the garbage!

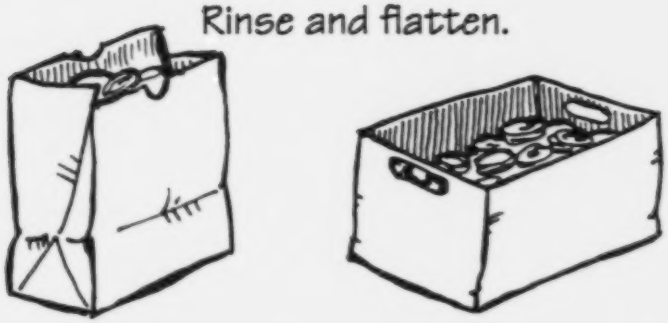
Aluminum Cans



Aluminum is used to make cans, foil, and pie plates.

Magnets won't attract aluminum.

Rinse and flatten.

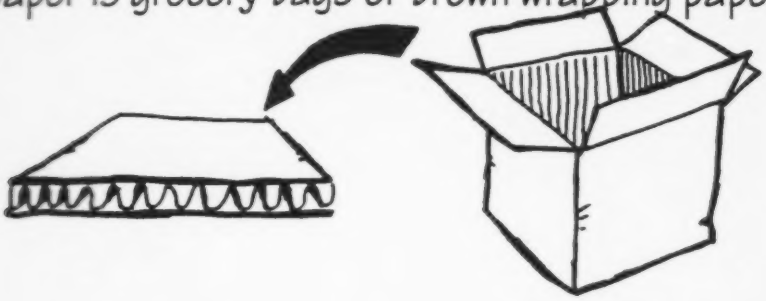


Put in bags or boxes.

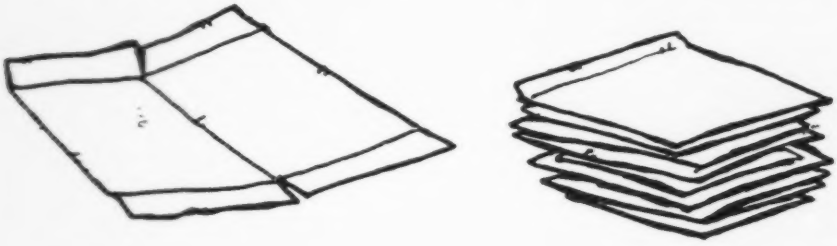
Recycling is as easy as taking out the garbage!

Kraft Paper and Cardboard

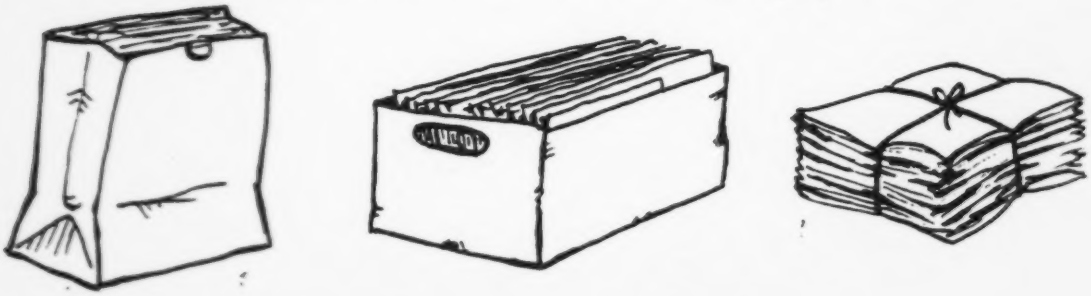
Kraft paper is grocery bags or brown wrapping paper.



Look for the ribbed, wavy layer in corrugated cardboard.
Don't recycle waxed or plastic-coated cardboard.



Flatten cardboard and stack with paper.



Put it in bags, boxes, or bundles.

Recycling is as easy as taking out the garbage!

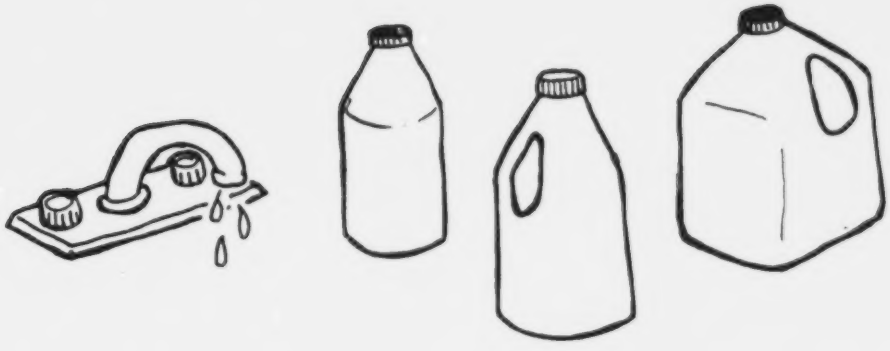
Motor Oil

Pour motor oil into a clean, leak-proof, nonbreakable container.

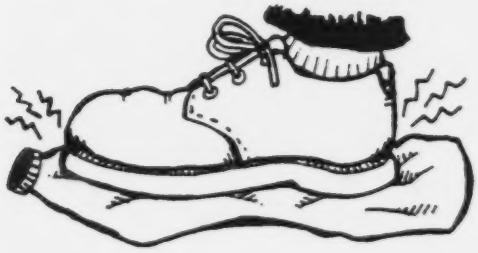
Put on the tight-fitting lid.

Recycling is as easy as taking out the garbage!

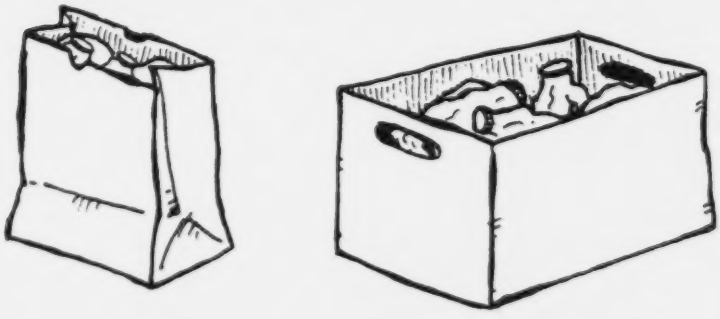
Plastic Jugs



Rinse.
(Don't rinse motor oil jugs, just leave the cap on.)



Step on the jugs to crush them.

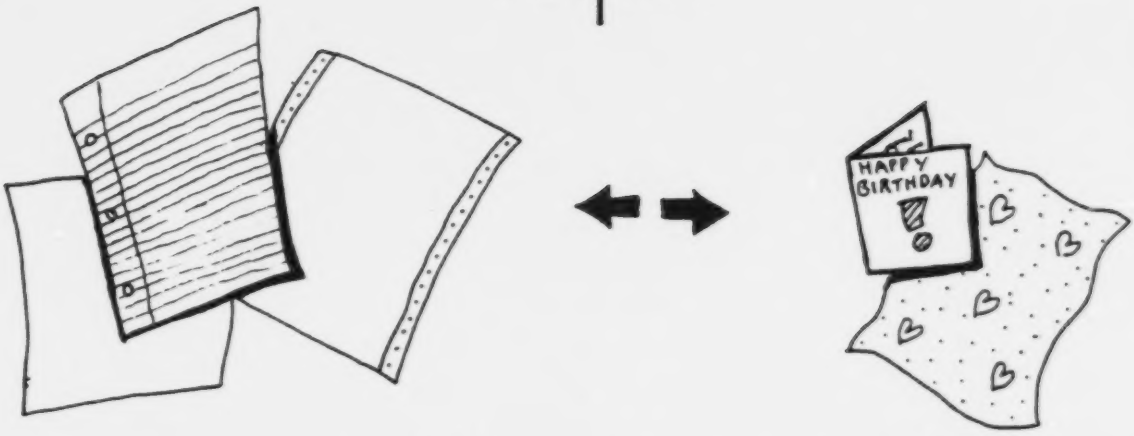


Put in bags or boxes.

99

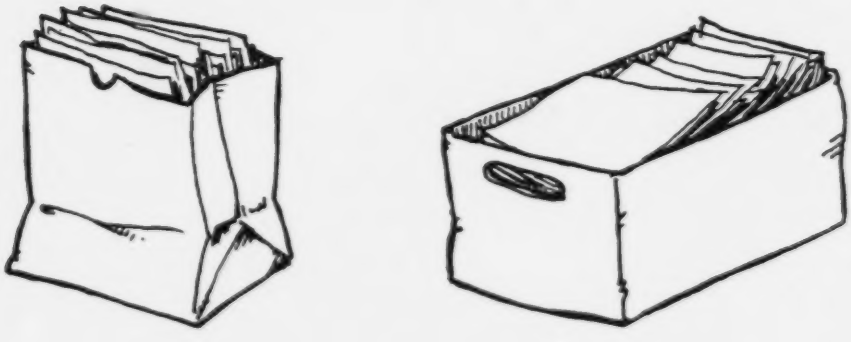
Recycling is as easy as taking out the garbage!

Paper



Separate white ledger paper from mixed, colored paper.

Don't recycle paper clips or envelopes.



Put in bags or boxes.

Recycling is as easy as taking out the garbage!

Facts And Figures About Solid Waste

➜ Americans throw away about 160 million tons of garbage each year. That's enough to fill a fleet of garbage trucks encircling the earth six times.

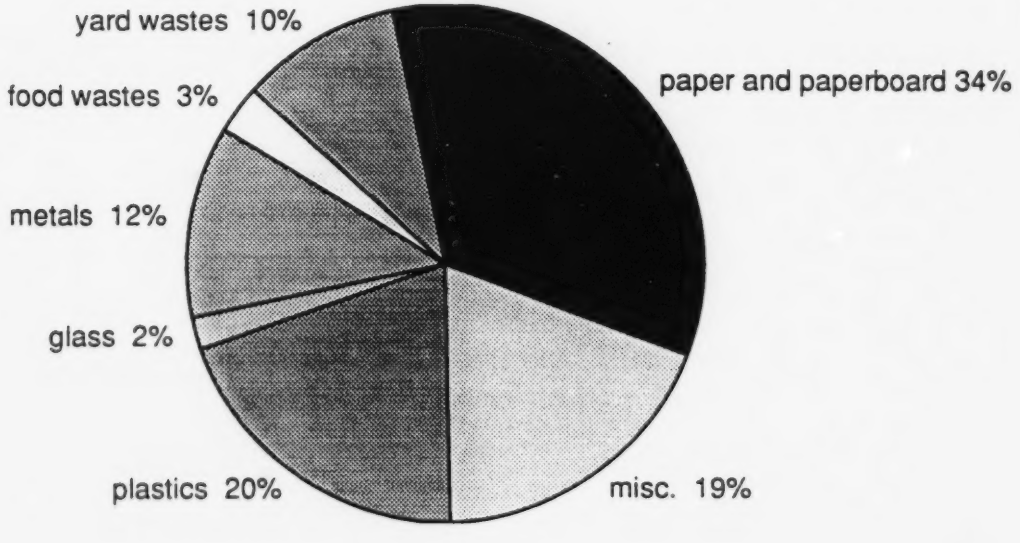
➜ It is difficult to build new landfills due to public opposition.

➜ In 1980, Illinois had 600 active landfills. Today, only 110 remain.

➜ At our current rate of disposal, all existing Illinois landfills will be closed by the mid-1990s.

➜ In Illinois, 85% of our solid waste goes to landfills, 2% is composted, 2% is incinerated, and only 11% is currently recycled.

Based on national averages by volume, our garbage is made up of:



Source: IEPA July 1991.

- Discarded packaging accounts for about one-third of all the solid waste in the U.S.A.

- Besides saving space in our landfills, reducing waste saves natural resources and energy. When materials are recycled, fewer natural resources are used.

- Recycling 117 pounds of paper saves one tree from being cut down.

- Using recycled waste paper to manufacture new paper uses at least one-third less energy compared to making paper from the wood pulp of trees.

- Various recycled paper grades can be made into new paper products like boxes, cartons, newspapers, or tissue paper products.

- Recycled aluminum cans can be transformed into new cans.

- Recycled steel can be turned into hammers, drills, and even steel used to build skyscrapers.

- Recycled glass containers can be made into new glass bottles and jars.

- Recycled plastic such as milk jugs (HDPE) and soda bottles (PET) can be processed and made into new products. Recycled soda bottles can be made into fiberfill for parkas and sleeping bags. Plastic lumber can be made from milk jugs and other plastics and used to build park benches and playground equipment.

Solid Waste Activity Packet Student Evaluation

Name _____ Date _____

Teacher _____ School _____

Grade _____ County _____

What Do You Recycle?

Do you and your family recycle the following things at home? Circle **YES** or **NO** for each category.

1. Soda cans **YES** **NO**
2. Glass jars **YES** **NO**
3. Newspaper **YES** **NO**
4. Plastic soda bottles **YES** **NO**
5. Plastic milk jugs **YES** **NO**
6. Tin cans **YES** **NO**

If you think of anything else you and your family recycle, write it in the blank below.

_____

What Do You Know About Waste?

Circle the answers **YES** or **NO** for the following questions.
If you have no idea what the answer is, circle **DON'T KNOW**.

7. Do we throw away too many things? **YES** **NO** **DON'T KNOW**
8. Is recycling the same as reusing? **YES** **NO** **DON'T KNOW**
9. Is there plenty of land near most of our towns for new landfills? **YES** **NO** **DON'T KNOW**
10. Can trash be burned at sanitary landfills? **YES** **NO** **DON'T KNOW**
11. Can you make less garbage? **YES** **NO** **DON'T KNOW**

Are the following all renewable resources? (Hint: Trees are renewable natural resources. New trees can be replanted to replace the trees we cut down.)

12. Oil **YES** **NO** **DON'T KNOW**
13. Natural gas **YES** **NO** **DON'T KNOW**
14. Trees **YES** **NO** **DON'T KNOW**
15. Gasoline **YES** **NO** **DON'T KNOW**

How Do You Reduce?

How often do you do the following things?
Circle the number which corresponds to the correct answer for you.

	Never	Seldom	Some-times	Frequently	Always	Don't know
16. Bring your own shopping bags to the store	1	2	3	4	5	6
17. Choose a product because it uses less packaging	1	2	3	4	5	6
19. Choose a reusable product rather than a disposable or throwaway one	1	2	3	4	5	6
18. Choose packaging that can be recycled when there is a choice	1	2	3	4	5	6
20. Choose a product made from recycled materials	1	2	3	4	5	6
21. Talk to adults about reducing waste	1	2	3	4	5	6

What Can You Do About Reducing Waste?

List three items you threw away today:

_____

_____

_____

Try to think of something you could have done with each item instead of throwing it away. Write down your ideas for each item in the blanks below;

_____

_____

_____

Solid Waste Activity Packet Teacher Evaluation

Name _____ Title/Position _____

School or Group _____ Phone _____

Address _____

With which grade level(s) was this material used? _____

Number of hours used? _____ Number of students? _____

Circle **YES** or **NO** to show whether you used the following programs from the *Solid Waste Activity Packet.*

Introductory Activities

Garbage-Bag Recipe	YES	NO
Out of Sight, Out of Mind	YES	NO
Solid Waste Bulletin Board	YES	NO
What Kind of Waste Am I?	YES	NO
Waste Reduction Guide for Illinois Schools	YES	NO

Reduce

Not in My Shopping Cart	YES	NO
Why Buy Me?	YES	NO
Paying the True Price of Pop	YES	NO
What Can I Do to Change Packaging?	YES	NO

Reuse

Trash or Treasure	YES	NO
Barter Day	YES	NO
Biography of a Favorite Thing	YES	NO
Crafts from Trash	YES	NO

Recycle

The Throwaway Three	YES	NO
Compost Column	YES	NO
Make Your Own Paper	YES	NO
How to Set Up a Home Recycling Center	YES	NO
Making Waves	YES	NO

Residue: Landfill and Incineration

When Will It Ever End?	YES	NO
Landfills	YES	NO
Making a Mini-Landfill	YES	NO
3-D Landfill Design	YES	NO
Incredible Edible Landfill	YES	NO
Trash to Ash	YES	NO

Resources for Teachers

Glossary	YES	NO
State Learning Goal	YES	NO
Additional Resources	YES	NO
Overheads	YES	NO

Please rank your impressions of the changes in your students' skills after participating in this project.

	No change	Slight change	Some change	Great change	Don't know
1. Students can distinguish objects made from renewable and nonrenewable resources	1	2	3	4	5
2. Students understand how people's behavior influences the volume of garbage.	1	2	3	4	5
3. Students can identify actions they can take to reduce, reuse, and recycle.	1	2	3	4	5
4. Students understand how recycling turns old products into new ones.	1	2	3	4	5
5. Students understand disposal options.	1	2	3	4	5

Please give examples of student changes recorded above. Feel free to add an additional sheet if necessary.

We are interested in your comments about these materials.

Classes sending in completed student and teacher evaluation forms found on the previous pages will receive a poster for use in their classes.

Thank you for your cooperation in filling out this survey. Please return it to:

State 4-H Office
1901 University Inn
302 E. John St.
Champaign, IL 61820